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Part 43
Maintenance, Preventive Maintenance Rebuilding, and Alteration

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Introductory Note

Part 43 is codified under Subchapter C, Aircraft, of Title 14 of the CODE OF FEDERAL REGULATIONS.

This FAA publication of the basic Part 43, effective July 6, 1964, incorporates Amendments 43–1 through 43–18 and any changes required by the Department of Transportation transition amendment.

Part 43—Maintenance, Preventive Maintenance, Rebuilding, and Alteration

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Adoption of Part 43

Adopted: April 15, 1964 **Effective: July 6, 1964**

(Published in 29 F.R. 5449, April 23, 1964)

This amendment adds Part 43 [New] to the Federal Aviation Regulations to replace Part 18 of the Civil Air Regulations and is a part of the Agency recodification program announced in Draft Release 61-25, published in the Federal Register on November 15, 1961 (26 F.R. 10698).

Part 43 [New] was published as a notice of proposed rule making in the Federal Register on November 13, 1963 (28 F.R. 12096), and given further distribution as Notice No. 63-37.

During the life of the recodification project, Chapter I of Title 14 may contain more than one Part bearing the same number. To differentiate between the two, the recodified Parts, such as this one, will be labeled "[New]". The label will of course be dropped at the completion of the project as all of the regulations will be new.

Many of the comments received recommended specific substantive changes to the regulations. Although many of the recommendations appear to be meritorious, they cannot be adopted as a part of the recodification program. The purpose of the program is simply to streamline and clarify present regulatory language and delete obsolete or redundant provisions. To attempt substantive changes, other than relaxatory ones that are completely noncontroversial, would delay the project and be contrary to the ground rules specified for it in Draft Release 61-25. However, we recognize that an overall substantive review of the Part is long overdue. This review is now being undertaken and all substantive comments received are being carefully studied.

A number of changes have been made in the proposal, both as a result of comments received and as a result of further review by the Agency. As proposed, amateur built aircraft would have been excluded from the applicability of Part 43 [New]. This exclusion has been broadened to include any experimentally certificated aircraft that had not previously been issued a different airworthiness certificate. These aircraft present unique maintenance requirements which can only be met on a case-by-case basis. To require compliance with Part 18 would be impractical and unnecessarily burdensome.

The maintenance authority of air carriers certificated under Part 40, 41, 42, or 46 and of commercial operators certificated under Part 42 has been transferred to those Parts and consolidated with other rules relating to their basic responsibility for maintenance.

The definition of "major alteration" in Part 1 [New] is being amended to exclude alterations listed in the aircraft, aircraft engine, or propeller specifications. This makes the definition consistent with Appendix A of Part 43 [New]. In addition, the definition of "airframe" is being amended, for clarity, to specifically include rotors.

Other minor changes of a technical clarifying nature have been made. They are not substantive and do not impose any burden on regulated persons.

The definitions, abbreviations, and rules of construction contained in Part 1 [New] of the Federal Aviation Regulations apply to Part 43 [New].

Interested persons have been afforded an opportunity to participate in the making of this regulation, and due consideration has been given to all relevant matter presented. The Agency appreciates the cooperative spirit in which the public's comments were submitted.

In consideration of the foregoing Chapter I of Title 14 is amended as follows, effective July 6, 1964, by adding a Part 43 [New] reading as hereinafter set forth, and by deleting Part 18.

This amendment is made under the authority of §§ 313(a), 601, 602, 603, 604, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1422, 1423, 1424, and 1425).

Amendment 43–1

Miscellaneous Amendments

Adopted: March 16, 1965 **Effective: April 1, 1965**

(Published in 30 F.R. 3637, March 19, 1965)

This amendment deletes "preventive maintenance" from the recordkeeping requirements of § 43.9 since CAR §§ 18.20 and 18.21, upon which § 43.9 is based, did not include "preventive maintenance".

Amendment 43–2

Altimeter System Requirements

Adopted: June 21, 1965 **Effective: July 29, 1965**

(Published in 30 F.R. 8259, June 29, 1965)

The purpose of this amendment to Parts 23, 25, 43, and 91 of the Federal Aviation Regulations is to increase safety and improve airspace utilization by revising design requirements dealing with airplane altimeter systems and by prescribing periodic inspections of systems installed in airplanes operating under IFR conditions. This action was published as a Notice of Proposed Rule Making (29 F.R. 3310) and circulated as Notice 64–14 dated March 12, 1964.

The need for the amendment results from recognition that altimeter system accuracy depends on good system design and is adversely affected by operations at higher altitudes and at higher airspeeds. Further degradation of system accuracy occurs in service caused primarily by static pressure system leaks and by instruments that have deviated from their original calibrations.

Agency action to upgrade altimeter system accuracy began with Notice of Proposed Rule Making (27 F.R. 4340) circulated as Draft Release No. 62–22 dated April 27, 1962. Among other provisions, Draft Release 62–22 proposed that the accuracy of the altimeter system of each new type aircraft be determined by an in-flight calibration of a number of production aircraft, with further provisions for inservice checks of altimeter system performance. Because standard methods of calibration remained to be developed, and because the project scope indicated that the end result might best be achieved by increments in several separate rule making actions, Draft Release No. 62–22 was withdrawn as a Notice of Proposed Rule Making although it did state the Agency's long-range program to upgrade altimeter system performance. Notice No. 64–14, on which this amendment is predicated, accordingly was limited in scope to design and check of airplane static pressure systems and test of altimeters.

Subsequent to Notice No. 64–14, the Federal Aviation Agency recodification program was completed. As explained in the Notice, recodification has not altered the substance of the rules. CAR § 3.665 is now FAR § 23.1325; CAR § 4b.612(b) is now FAR § 25.1325; proposed CAR § 18.31 and a portion of proposed FAR § 91.170 have become FAR Part 43, Appendix E. The appropriate FAR identification will be used hereinafter.

In response to the Notice of Proposed Rule Making, the Agency received several comments objecting to the overall proposed changes. The main thrust of these unfavorable comments was that the new rules would impose costs disproportionate to resulting increases in reliability, utility, or safety, and that the accident record of airplanes operated under the general operating rules did not justify the proposed changes.

The Agency must reject any contention that revised rules upgrading the accuracy of altimeter systems are unwarranted. Surveys have revealed that a high percentage of airplanes have leaky static pressure systems. Accident reports in certain instances have pointed to altimeter errors; in other unexplained accidents, errors in instruments dependent on static pressure source may not be ruled out as contributing causes. If increased safety and more effective airspace utilization are to be achieved, all airplanes operated in IFR conditions must meet the same altimeter system equipment installation standards to operate in controlled airspace.

The changes and comments relating to the various specific parts of the Federal Aviation Regulations are discussed in the following paragraphs.

FAR § 23.1325—The Notice of Proposed Rule Making provided that the influence of airplane characteristics not seriously affect the accuracy of instruments having static pressure connections, further specified certain static system design and installation details, required a system proof test, and made provision for countering icing conditions.

Paragraph 23.1325(a) has been amended to specify that static pressure connections be vented so that external forces least affect instrument accuracy. This change relaxes the requirement of the Notice and parallels the wording in the comparable section of Part 25.

One commentator would delete the system proof test on the grounds that it does not reveal errors caused by a poorly designed or located static source, and that, in any event, such small static leaks as it might divulge do not result in static system errors. The Agency, however, considers the proof test a necessary part of certification because, after the design is completed, system leakage becomes the major criterion which cannot be ignored until its effect is proven inconsequential.

Two commentators objected to proof testing the static pressure system in each production airplane. The rule, however, does not require test of each production airplane although that would be one way to demonstrate conformity to the approved type design. As suggested by another commentator, sample testing and production flight check could be another acceptable means of showing conformity if there were a showing of an adequate quality control system and compliance with the equipment function and installation requirements of § 23.1301.

The Agency does not concur with various comments recommending that it adopt the Air Force static system leakage rate at an arbitrary specified altitude with associated instruments disconnected. Since many static system leaks occur at instrument disconnect points, it is considered that a realistic test for Part 23 airplanes should be made with the instruments connected. Section 23.1325(b)(2) has been amended, however, to allow a reasonable leakage loss tolerance with associated instruments connected at the airplane maximum operating altitude.

With regard to negating the effect of icing conditions, one commentator recommended deleting the requirement altogether in low-performance airplanes operating under VFR conditions. Two other commentators recommended that a protected alternate source of static pressure be allowed, while a fourth recommended use of an optional ice-free static pressure source of less accuracy where calibration is given the pilot.

Since static vent icing may occur during both VFR and IFR conditions with hazardous consequences, the Agency believes there is ample justification for anti-icing as a certification requirement on all airplanes employing a static pressure system for required instruments. In response to the comments, the proposed rule has been expanded to permit the use of an alternate static source having a prescribed accuracy tolerance, and, where needed, a correction card.

FAR § 25.1325—The Notice of Proposed Rule Making altered the existing rule in part by adding an anti-icing provision, by specifying certain installation and design details plus a system proof test, and by allowing an altimeter correction device bypass instead of an alternate altimeter system.

Several commentators contended that the proof test would be unrealistic because no tolerance was provided and it was unclear whether the specified test pressure referred to

differential or absolute pressure. Further comments variously recommended adoption of military requirements for leakage rate with associated instruments disconnected, adoption of a 400-foot per minute rate at 40,000 feet, and adoption of different system tolerances for pressurized and unpressurized airplanes. The Agency agrees with the comments concerning tolerance and pressure ambiguity, and, accordingly, has amended the requirement for type certification to include proof test at a pressure differential corresponding to the certificated maximum operating altitude. The rule has been further amended to specify a reasonable maximum leak rate of 100 feet per minute with associated instruments connected. The Agency does not agree with the recommendation for different system tolerances for pressurized and unpressurized airplanes since an altimeter system must perform satisfactorily in the most critical range when the airplane pressurization system fails.

The Agency does not concur with the contention of one commentator that the Notice is arbitrary in specifying that pressure remain unaltered when exposed to continuous and intermittent maximum icing conditions. An airplane is certificated for a certain severity of icing condition which applies to all required installations including the altimeter.

Further comments to the effect that automatic correction devices be required for high altitude—high speed airplanes and that correction cards be used where automatic correction devices are not available, were either beyond the scope of the notice or already covered by current functional and installational requirements.

It was suggested that the intent of the requirement for a correction device bypass or alternate systems be clarified. The Agency feels, however, that the objective of the requirement is adequately stated and that it would be impractical to be more specific in an attempt to cover all possible design features.

FAR Part 43, Appendix E—The Notice of Proposed Rule Making described new altimeter instrument tests for scale error, hysteresis, after effect, friction, case leak, position error, and barometric scale error.

In the interest of organizational unity, this Appendix has been expanded to encompass the details of the static pressure system test and inspection as proposed in § 91.170 in addition to the altimeter instrument tests.

In response to several comments, the static pressure system leakage test has been amended to allow a leakage tolerance instead of the requirement that the system be leak free.

A number of commentators objected to the cost of upgrading altimeter standards and recommended that tests for scale error, hysteresis, and friction be limited to the maximum operating altitude of the airplane in which installed. The Agency concurs and the rule is amended accordingly.

One commentator suggested that all standard atmosphere data be taken from the same source. The Agency concurs and has used "U.S. Standard Atmosphere, 1962" as the sole source for altitude-pressure-tolerance values.

A comment contending that five test altitudes for low-performance airplanes is sufficient was not supported by any justification. Also a comment suggesting that test points be selected that fall precisely on the instrument 20-foot scale marks was considered unjustified since in normal test procedures, one quarter of a scale division is not difficult to estimate.

The Agency agrees that the 12–hour rest period at 29.92 inches Hg is an unnecessary hardship and has deleted it as a preliminary requirement in the scale error test.

One commentator recommended deletion of tests for hysteresis, after effect, friction, position error, and barometric scale error since scale error and case leak tests are sufficient to determine if the altimeter should be returned to service. Another comment stated that the barometric scale error test was too extensive. The Agency concurs that the position error test is unnecessary and it has been deleted. Other relief has been afforded by changing specified test points in the hysteresis test and reducing the barometric scale error test to only eight test pressures. The test for hysteresis, after effect, friction, and barometric scale error are considered essential for checking the quality of the instrument and its indicating accuracy consistency and, therefore, have not been deleted.

The Agency did not adopt a recommendation that the 20,000 feet per minute rate of pressure change for the scale error test be reduced since no justification was presented.

Several commentators suggested creating new classes or categories of altimeters for different altitude ranges, with less stringent test criteria for those operating at the lower

altitudes. The Agency does not concur in these recommendations since, for IFR operation, altimeter system test standards must be the same for all airplanes regardless of altitude of operation or whether the airplane is pressurized.

The Agency agrees with a recommendation that the altimeter be vibrated to remove friction effect before taking test readings and has amended the test procedure accordingly. However, a further recommendation that the vibration frequency be specified, if adopted, would impose an unnecessary burden since the purpose of vibration is to eliminate errors due to friction within the instrument.

In reply to a comment pointing to the impracticality of conducting each altimeter test at 29.92 inches Hg and 25 degrees C, the final rule has been changed so as to delete the 29.92 inches Hg pressure requirement and to prescribe appropriate allowances to be made when test temperatures are substantially different from an ambient of 25 degrees C.

FAR § 91.170. The Notice of Proposed Rule Making proposed this new requirement to provide for repetitive checks of the static pressure system in all general aviation airplanes and of altimeter instruments installed in airplanes operating under IFR conditions other than those coming under Part 121.

The amended § 91.170 properly charges the operator with responsibility for insuring that the airplane has been tested and inspected prior to flight in IFR conditions. The specific static pressure system test requirements have been removed from this section and incorporated into Part 43, Appendix E in order that the complete altimeter system test and inspection procedure be contained under one appropriate heading.

Three commentators indicated some confusion between the proposed two-year inspection and the periodic airworthiness inspection of § 91.169 for aircraft having dual altimeters. New § 91.170 has been reworded to delete reference to periodic inspections and emphasize that the biennial special altimeter system inspection is a requirement independent of the annual or 100-hour inspection required by § 91.169. The final rule also emphasizes that each static system of a dual system, as well as each altimeter instrument, is to be inspected.

Two commentators pointed to hardships due to a shortage of Class I instrument repair stations. It is the Agency's position, however, that the new inspection requirements impose no undue hardship on operators since the inspection interval is long, and operations may be scheduled to place airplanes at repair stations. In any event, only IFR operations would be curtailed should the required inspection not take place. Some relief is afforded in the final rule by permitting the altimeter tests to be made by an appropriately rated repair facility rather than a certificated Class I instrument rated repair station.

Several commentators recommended in effect that the rule be extended to prescribe accuracy tolerances and periodic accuracy checks of instruments used in VFR conditions. While the recommendations have merit, they go beyond the scope of present rule making. Under the current regulations, when VFR flight conditions prevail, collision avoidance is primarily dependent on visual means rather than vertical separation by altimeter information.

The final rule has been changed to provide for a § 91.170 compliance date one year from the effective date of the amendment.

Interested persons have been afforded an opportunity to participate in the making of this amendment. All relevant matter submitted has been fully considered.

In consideration of the foregoing, Parts 23, 25, 43, and 91 of the Federal Aviation Regulations are amended effective July 29, 1965, as hereinafter set forth.

This amendment is made under the authority of sections 313(a), 601, and 603 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1422).

Amendment 43–3

Change of Name of "Periodic Inspection" to "Annual Inspection," and Clarification of 100–hour Inspection Requirement

Adopted: February 25, 1966 **Effective: April 2, 1966**

(Published in 31 F.R. 3336; March 3, 1966)

These amendments change the name "periodic inspection" to "annual inspection" throughout the Federal Aviation Regulations, and make clear the conditions under which an inspection satisfying the 100-hour inspection requirement of § 91.169(b) also satisfies the annual (formerly "periodic") inspection requirement of § 91.169(a). No substantive change is made by these amendments.

These amendments are based on, and are issued for the reasons contained in, Notice 65–26, published in the Federal Register (30 F.R. 13167), on October 15, 1965. All comments received in response to Notice 65–26 favored the changes proposed therein.

Comments not directly related to the notice suggested (1) that the references to Part 43 in § 91.169 be changed to references to Part 65, (2) that the "excess time" provision of § 91.169(b) be deleted, and (3) that the authority of the holder of an inspection authorization to approve products for return to service be made explicit in § 65.95(a)(2). These comments do not affect the disposition of Notice 65–26 and will be given future consideration.

In consideration of the foregoing, Chapter I of Title 14 of the Code of Federal Regulations is amended, effective April 2, 1966, as hereinafter set forth.

These amendments are made under the authority of sections 313(a) and 601 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a) and 1421).

Amendment 43–4

Certificated Repair Stations: New Limited Rating for Manufacturers

Adopted: March 25, 1966 **Effective: October 1, 1966**

(Published in 31 F.R. 5248, April 1, 1966)

This amendment lets certain manufacturers obtain, without further showing, a repair station certificate with a limited rating under Par 145 in order to perform maintenance and preventive maintenance on articles manufactured by them. This amendment also broadens the manufacturer's rebuilding and alteration authority under § 43.3 to include appliances and parts manufactured under an FAA Parts Manufacturer Approval (PMA).

This amendment is based on, and is issued for the reasons contained in, Notice No. 65–24, published in the Federal Register (30 F.R. 11773), on September 15, 1965.

No substantive change from the Notice is made by this amendment. The only change is one of form. The Notice proposed the issue of a Manufacturer's Maintenance Facility Certificate. This certificate would have been issued under sections of Parts 21 and 37. However, since the creation of an air agency under § 607 of the Federal Aviation Act of 1958 is involved, it is more appropriate to consolidate the several proposed changes into a single amendment to *Subchapter H—Schools and Other Certificated Agencies*. As the Notice mentioned, the Agency considers that the standards met by a manufacturer to obtain a production certificate, an approved production inspection system, or other approved quality control system, provide a level of safety equivalent to that achieved under the standards applicable to a certificated repair station with a limited rating. The certification and rating process already established under Part 145 is the most efficient basis for giving manufacturers privileges similar to those of repair stations (which is the purpose of this amendment). Certain manufacturers have ex-

pressed concern that public awareness of the relationship between a manufacturer and his product could be impaired if the name of the certificate issued under this amendment could in any way cloud the identity of the manufacturer as a manufacturer. Weighing the public interest in obtaining the maximum use of existing certification procedures versus this genuine concern of the manufacturer, the Agency finds it appropriate to create a separate subpart in Part 145 that is unmistakably identified with the manufacturer. For this reason, new Subpart D is created, providing for the issue of limited ratings for manufacturers, and providing that any facility where the holder of the rating performs maintenance or preventive maintenance may be referred to as a "manufacturer's maintenance facility".

For each basis shown by the manufacturer for qualifying under § 145.101(a), he is entitled to one certificate. For example, a manufacturer holding two Production Certificates is entitled to two certificates. A manufacturer holding one Production Certificate, one Type Certificate with an approved Production Inspection System, and one TSO authorization is entitled to three certificates. Each certificate may be issued for any business address chosen by the manufacturer. This chosen address need not be in the United States, nor need it be one at which he manufactures the articles covered by his Production Certificate or other authorization used to qualify under § 145.101(a). Further, the manufacturer need never perform, nor intend to perform, maintenance at the chosen address.

Consistent with the manufacturer's present authority to rebuild and alter his products at any place he chooses, the listing of the chosen business address on the certificate issued under § 145.101(a) in no way limits the places at which the manufacturer may perform maintenance. However, if the experience or conduct of a particular manufacturer makes it necessary for safety, restriction to a particular facility will be specified in words of limitation placed on the repair station certificate issued for that facility. This is reflected in § 145.103(b).

One comment mentioned that manufacturers may be organized more for production than for maintenance, and recommended that the final rule specifically require the manufacturer to issue a maintenance release describing all work performed. The necessary recording of work performed is adequately covered in §§ 43.9 and 43.11. No additional rule for manufacturers is necessary. Consistent with the Notice, and with the rules for other persons who perform maintenance, this amendment specifically makes the performance standards of Part 43 applicable to manufacturers covered by Subpart D.

One comment requested that the proposed maintenance privileges be extended to foreign manufacturers who have service facilities in the United States, or who send engineering representatives to the United States to handle service problems of United States registered aircraft based in the United States. Foreign manufacturers, as such, are not excluded from this amendment. Any foreign or domestic manufacturer who qualifies under § 145.101(a) is entitled to a certificate and limited rating without further showing, and may perform maintenance, as a manufacturer, at any service facility or other location within or outside the United States. Similarly, neither the foreign nor domestic manufacturer is entitled to a certificate under § 145.101(a) unless the applicable bases of approval listed therein are met. The findings made in granting these approvals provide the basis for the Agency's assurance that the manufacturer, foreign or domestic, can safely perform maintenance.

Comments suggested that the manufacturer be allowed to use any qualified person in the exercise of the granted maintenance privilege, not necessarily certificated airmen. Ultimately, regardless of whether or not facilities as such are certificated, the actual maintenance will be performed with individuals directly in charge. Section 101(7) of the Federal Aviation Act of 1958 defines each individual directly in charge of maintenance as an "airman". Section 610(a) of the Act makes it unlawful for any person to serve in any capacity as an "airman" without an "airman" certificate. Thus, regardless of certification of the manufacturer's facilities as an air agency, the individuals that it employs directly in charge of maintenance must be certificated airmen.

Comments questioned whether the proposed maintenance privileges in fact give relief to the manufacturer since, under § 43.3(d), he may already perform maintenance under the supervision of certificated mechanics. For manufacturers for whom this alternative is attractive, this proposal is not intended to provide relief. The same is

true for repair stations who choose to operate through certificated airmen under § 43.3(d) rather than obtain air agency certification under Part 145. These comments miss the following point: for manufacturers who desire to perform maintenance and return products to service without the need for mechanics as prescribed in Part 43, and to hold themselves out to the public for this purpose as an air agency, this amendment provides an outlet equivalent to that already enjoyed by certificated repair stations. This is the sole purpose of this amendment.

One comment objected to proposed § 43.3(1)(3) because it lets manufacturers of aircraft inspect engines and propellers of those aircraft even though not "manufactured" by him. Proposed § 43.3(1)(3) is substantially identical to the present rule. No change is intended. Section 43.3(1)(3) merely reflects an editorial change resulting from the inclusion of FAA-PMA manufacturers in § 43.3.

One comment objected to the proposals on the basis that the responsibilities imposed on the manufacturer under Part 43 could lead some air carriers, whose aircraft were maintained by the manufacturer, to conclude that the manufacturer has assumed some of the air carrier's responsibility for safe maintenance. Sections 121.363(b) and 127.131(b) specifically prevent this conclusion.

One comment requested that the manufacturer be required to perform maintenance in accordance with a manufacturer's approved manual. To require that each manufacturer prepare and obtain approval of a maintenance manual for all products manufactured by him in the past, and products currently being manufactured by him, including parts and appliances, would far exceed the present requirements applicable to manufacturers. Further, to do so would impose a burden that is not necessary for the proper administration of this amendment in the interest of safety, since this amendment makes all manufacturers subject to Part 43, including § 43.13 which requires that acceptable methods, techniques and practices be used to maintain each article in its original or properly altered condition.

In consideration of the foregoing, Parts 43 and 145* of Chapter I of Title 14 of the Code of Federal Regulations are amended, effective October 1, 1966, as hereinafter set forth.

This amendment is issued under the authority of sections 313(a), 601, 602, 605, and 607 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1422, 1425, and 1427).

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*Part 145 is published separately.

Amendment 43–5
Mechanical Work Performed on U.S. Registered Aircraft by Certain Canadian Mechanics

Adopted: April 13, 1966 **Effective: May 2, 1966**

(Published in 31 F.R. 5948, April 19, 1966)

The purpose of this amendment is to include in Part 43 of the Federal Aviation Regulations the provision of present Special Federal Aviation Regulation 10 (formerly Special Civil Air Regulations 377D) authorizing certain certificated Canadian mechanics to perform mechanical work in Canada on aircraft of United States registry.

This action was published in the Federal Register as Notice No. 65–32 (30 F.R. 13787) on October 29, 1965.

There were no adverse comments received in response to the notice of proposed rule making. However, in response to a comment from the Canadian Civil Aviation Branch of the Department of Transport, the term "engineer" has been changed to "aircraft maintenance engineer". In addition, the Canadian Department of Transport also pointed out that they have approved companies doing aircraft maintenance, repair and overhaul whose delegated representatives may certify aircraft or repair work on behalf of the company and it was suggested that this be taken into consideration in amending the regulations. The Agency agrees that a change in the present regulations along the lines

suggested by the DOT would be appropriate in order to provide for the uniform administration of the reciprocal arrangement. However, since such a change is not within the scope of this notice of proposed rule making, the Agency intends to issue a new notice in the near future which would propose that the present regulation be expanded to authorize Canadian approved companies to examine, inspect and approve aircraft of U.S. registry following major repair and alterations as well as make the required certification following maintenance, preventive maintenance and alteration.

Interested persons have been afforded an opportunity to participate in the making of this regulation, and due consideration has been given to all relevant matter presented. Since this regulation extends the provision of a currently effective regulation which terminates on May 1, 1966, imposes no additional burden on any person and a delay in its effectiveness would interrupt the reciprocal arrangement, good cause exists for making it effective on less than 30 days' notice.

This amendment is issued under the authority of Sections 101(7), 313(a), 601, 605 and 610 of the Federal Aviation Act of 1958 (49 U.S.C. 1301(7), 1354(a), 1421, 1425 and 1430).

In consideration of the foregoing, Part 43 of Chapter I of Title 14 of the Code of Federal Regulations is amended by inserting the following new § 43.17 after § 43.15, effective May 2, 1966.

Amendment 43–6

Cross Reference Corrections in FAR Parts 21, 33, 37, 43, 61, 63, 91, 127, 133, 141, 145, 149, and 183

Adopted: June 28, 1966 **Effective: July 6, 1966**

(Published in 31 F.R. 9211, July 6, 1966)

These amendments update certain cross references in the Federal Aviation Regulations and make other miscellaneous corrections.

At the time of the recodification, it was necessary to include in the Federal Aviation Regulations cross references to the Civil Air Regulations or Special Civil Air Regulations where the referenced provision had not yet been recodified. These amendments update all these cross references in instances where no substantive change is involved. In some instances, the cross references as updated herein have been anticipated in compilations and reprints of the respective Parts of the regulations.

For convenience, a table is utilized to state the changes that can be accomplished by a mere substitution of the proper cross reference.

The original publication of section 91.101(a) referred to the "Bureau of Commerce" instead of the "Bureau of Customs". This error is being corrected. The introductory sentence of subparagraph (b)(5) of Appendix B of Part 141 is corrected by the addition of a line of text that was inadvertently omitted in the recodification.

Since this amendment does not involve any substantive change and does not impose a burden on any person, notice and public procedure thereon are unnecessary, and the amendment may be made effective immediately.

In consideration of the foregoing, Chapter I of Title 14 is amended, effective July 6, 1966.

This amendment is made under the authority of section 313(a) of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a)).

Amendment 43–7

Altimeter System Requirements

Adopted: May 16, 1967 **Effective: August 1, 1967**

(Published in 32 F.R. 7585, May 24, 1967)

The purpose of this amendment to Parts 23, 25, 43, and 91 of the Federal Aviation Regulations is to revise the design standards concerning static pressure systems and to revise the test requirements applicable to the maintenance of altimeter systems.

This amendment is based on a Notice of Proposed Rule Making (Notice No. 66–44) published in the Federal Register December 31, 1966 (31 F.R. 16790).

Numerous comments were received in response to Notice 66–44, most of which were in agreement with the proposal. The more pertinent of the comments that raised questions together with changes in the proposal resulting therefrom are discussed hereinafter.

With reference to the static pressure system proof test required under both Part 23 and Part 25, an inconsistency in wording was noted in regard to the pressure differential at which the tests are run for unpressurized aircraft. Since there is no reason for different requirements, § 25.1325(c)(2)(i) has been modified to require a pressure differential of approximately 1 inch of mercury rather than the absolute value of 1 inch as stated in the Notice.

One commentator pointed out that the requirement that the proof tests of the static pressure systems on unpressurized aircraft be conducted with the static pressure system evacuated to a pressure differential based on an altimeter reading of 1000 feet at sea level could be confusing to people located at elevations above 1000 feet mean sea level. The FAA agrees and §§ 23.1325(b)(2)(i) and 25.1325(c)(2)(i) have been further amended to permit the proof test of unpressurized aircraft with the static pressure system evacuated to an altimeter reading of 1000 feet above the airplane elevation at the time of the test.

It was recommended that § 25.1325(c)(2)(ii) be changed in its entirety to provide a new leak test tolerance formula that would reduce test ambiguities resulting from calculating the two percent tolerance using pounds per square inch or feet altitude at different airport elevations. In this connection, the FAA previously investigated the feasibility of establishing a quantitative static system test. That investigation, however, indicated that a quantitative test was much to complex for general use but that the simplified qualitative test would be satisfactory and would provide adequate results without any adverse effect on safety. The latter was accordingly proposed in the Notice. In the interest of simplicity and ease of performance, the FAA is retaining the test references in terms of feet altitude even though this qualitative approach may give minor differences in test results where the tests are run at different field elevations.

One commentator stated that the proposed § 23.1325(b)(3) requirement for a correction card where altimeter readings on primary and alternate static systems differ by more than 50 feet, is too restrictive at high altitudes and high Mach numbers and suggested clarification as to the range of altitude and Mach numbers applying to this tolerance. However, the FAA believes that the proposed requirement is necessary to assure proper vertical separation considering the entire altitude-speed range. In the high Mach—high altitude regime, the static system accuracy may be marginal at best and errors introduced while on the alternate system could lead to hazardous operation if the pilot is not informed of the magnitude of the error. In the low speed—low altitude regime, static system errors are minimized so that correspondence between the two systems should pose no problem.

As noted by one commentator, the first altitude entry in Table I, Appendix E, Part 43, was inadvertently printed as 1000 feet when it should have been —1000. The Table has been corrected accordingly.

One of the comments contained a recommendation that section (c) of Appendix E should be changed to require recording of date and test altitude on the altimeter dial. The FAA does not, however, agree with the recommended change. Such a requirement would result in the unnecessary cluttering of the instrument face and unnecessary expense and inconvenience due to instrument removal and teardown in order to record

the information on subsequent inspections. The requirement that the date and maximum altitude to which the altimeter has been tested be recorded on the altimeter, is necessary to provide the information for entry in the airplane log or other permanent record when the instrument is installed in an airplane. With the maximum altitude for the altimeter entered in the aircraft log, there is no need, insofar as the pilot is concerned, to enter that data on the face of the instrument.

In connection with the altimeter test and inspection, comments variously suggested the importance of preliminary pilot system checks to preclude damage to the airspeed meter, of periodic purging of pitot and static lines, and of information concerning the accuracy of altimeter test equipment. The FAA sees merit in these comments, and contemplates that to the extent that it has not already been accomplished, such information will be presented as acceptable means of compliance with the proposed rules in appropriate Advisory Circulars.

One commentator suggested changes to section (c) of Appendix E to eliminate the requirement for commercial operators to prepare records under § 43.9 in addition to those they presently keep. Commercial operators of large aircraft maintained in accordance with a continuous airworthiness program under Part 121 are exempted from the requirements of § 91.170 by the provisions of § 91.161. Therefore, there is no need for the recommended change insofar as such operators are concerned. On the other hand, commercial operators of small aircraft are governed by Part 135 of the FARs and they are not required to maintain their aircraft under a continuous airworthiness program. The provisions of present section 43.9(a) apply to such operators and they would not, by the proposed rule, be required to prepare records in addition to those they presently keep. The recommended change is, therefore, unnecessary.

Expressing the belief that the proposed regulation would require periodic removal of the altimeter instruments for the required tests and inspections, one comment indicated that extensive work behind the instrument panel can cause malfunctions of other equipment disturbed in the process. For this reason, the comment suggested that there should be an amendment to allow airframe repair stations to use external connections to test the static system and the altimeter using a reference altimeter that is calibrated against a master semi-annually. The FAA presently permits the use of external connections to test the static and altimeter systems. However, the Advisory Circular covering this matter suggests that the reference altimeter be calibrated once each month until the necessary interval between calibration checks can be determined. Using this procedure, it may be that the accuracy of the reference altimeter can be maintained by a semi-annual calibration.

The proposal has not been revised in accordance with the recommendation that altimeters and static systems be tested and inspected once each year instead of each 24 months. Based on current experience as reported by major altimeter manufacturers and repair stations, the FAA has determined that an altimeter instrument and static system will maintain accuracy and integrity for 2 years following a test and inspection. To require yearly tests of either or both systems would impose a burden on owners and operators without a corresponding increase in safety.

Numerous comments were received concerning the persons authorized to perform the tests and inspections of the static pressure system and the altimeter instrument. One comment suggested that the designation should have included non-certificated repair stations and fixed base operators. In this connection, it should be pointed out that the static pressure system and altimeter instrument tests and inspections are maintenance items and must, therefore, be performed by persons certificated to perform maintenance. Moreover, the tests and inspections require sophisticated test equipment and a capability that must be maintained under a system of periodic inspections. It is only through the certification procedures that the FAA is able to regularly conduct surveillance of the approved facilities and make periodic determinations as to their capability. Another comment suggested that a certificated "A & P" mechanic should be permitted to conduct the necessary tests and inspections. The FAA agrees with this comment insofar as the static pressure system tests are concerned and the regulation has been so revised. However, the FAA does not consider that it would be appropriate to authorize certificated mechanics to conduct the required altimeter tests and inspections in the light of the test equipment and capability that is necessary for those tests and inspections. The opinion was also expressed that the proposal would permit certificated repair stations

with airframe ratings to accomplish an instrument major repair without the necessity of obtaining an instrument rating. As proposed, the rule permits a repair station having an airframe rating to conduct the tests and inspections necessary for the altimeter instrument. However, the rule does not permit repair stations with only an airframe rating to accomplish any repairs to the instrument. Contrary to the understanding of this commentator, the altimeter tests covered under this proposal are not considered to be major repairs to the altimeter. Finally, the FAA does not concur with the recommendation that the provision designating the persons authorized to conduct the required inspections and tests be deleted from § 91.170 and added to Appendix E in Part 43. While it is true that Appendix E contains the scope of the required inspections and tests that the designated persons are authorized to conduct, the FAA considers that from the standpoint of the owner or operator of an airplane, it would be better to set forth the designation in the operating requirements of Part 91 rather than as part of the technical details of the inspections and tests in the Appendix to Part 43.

The present requirements of § 91.170 apply only to persons operating an airplane in controlled airspace under IFR. The phrase "in controlled airspace," which limits the applicability of § 91.170, was incorporated into the regulation after consideration by the FAA in an appropriate rule-making action. However, a comment has now been received in response to Notice 66–44 requesting the FAA to delete the phrase "in controlled airspace" on the ground that a substantial number of IFR flights are made within uncontrolled airspace and that there is no reason why the altimetry maintenance and alteration standards should not apply to IFR flight in both controlled and uncontrolled airspace. While this comment involves a substantive change to the present requirements that goes beyond the scope of this Notice of Proposed Rule Making, the FAA believes that it warrants further consideration in connection with other altitude indication projects now in process.

Interested persons have been afforded an opportunity to participate in the making of this amendment, and due consideration has been given to all matter presented.

In consideration of the foregoing, Part 23, 25, 43, and 91 of the Federal Aviation Regulations are amended effective August 1, 1967.

This amendment is made under the authority of sections 313(a), 601, and 603 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, and 1423).

Amendment 43–8

Air Travel Clubs

Adopted: September 5, 1968 **Effective: October 14, 1968**

(Published in 33 F.R. 12887, September 12, 1968)

The purpose of these amendments is to provide certification and operation standards for air travel clubs using large airplanes in the conduct of their operations.

These amendments are based on a notice of proposed rule making published in the Federal Register on July 13, 1967 (Notice 67–27, 32 F.R. 10311). Interested persons have been afforded an opportunity to participate in the rule making through submission of written comments. Due consideration has been given to all relevant matter presented.

In Notice 67–27, the FAA proposed to enlarge the applicability of Part 121 to apply the commercial operator certification and safety standards of that part to air travel clubs. As stated therein ". . . when a passenger has, in any manner, paid for his carriage aboard a large aircraft the FAA believes that the applicable safety standards should not depend on a distinction as to whether that passenger is carried for 'compensation or hire' or is 'sharing expenses' with other passengers. The average passenger certainly is not aware that the method by which he pays for his carriage determines the level of safety that the operator of the aircraft is required to maintain. Except for the method of payment, the typical travel club operation is in all practical respects no different from a charter

flight conducted by a commercial operator, and the FAA believes that the level of safety required by Part 121 should be maintained."

Upon considering the comments submitted by the air travel clubs and other interested persons, the FAA has determined that the form of the proposed rules should be changed by establishing a new Part 123 to govern the certification and operations of these clubs. This is being done in order to provide some variation from the commercial operator rules to accommodate certain unique characteristics of air travel clubs. For example, the travel clubs derive their income from dues, travel fares, and assessments on their membership. Consequently, the requirements for retention of contracts and submission of detailed financial statements have been omitted. Air travel club operations are also more sporadic and not subject to tight schedules. Therefore, detailed flight time limitations are not necessary and relieving crewmembers from all duty for eight hours out of each 24 consecutive hours will suffice.

There are also differences with respect to maintenance. Most air travel clubs operate their aircraft for a relatively small number of hours when compared to commercial operators of large aircraft. These limited operations do not require a full time maintenance department and such an organization would be economically unfeasible for most air travel clubs. Therefore, the clubs will be permitted to continue using the same basic maintenance system that is required for general aviation aircraft. However, certain controls are being added to improve the reliability of this system. The major aspect of these controls is the establishment of a continuous inspection program similar to that required of Part 121 operators. As a part of its manual, the air travel club must provide instructions, procedures, and schedules for detailed and continuous inspection of its aircraft. The manual will also provide a system of records for defects discovered during these inspections. This inspection program is being required in place of the 100-hour, annual, or progressive inspections provided for under Part 91 and will have to meet with FAA approval, to be granted through operations specifications issued to each certificate holder. In conjunction with this new inspection requirement, the certificate holder is being charged with the ultimate responsibility for having these inspections performed in accordance with its manual. The inspections will be performed by certificated mechanics or repair stations at the direction of the certificate holder. All other maintenance will be performed in accordance with Parts 43 and 91 as has been done in the past.

The effective date of the new rules and the provisions of § 123.3 are designed to permit continued operations by air travel clubs that are organized and in operation on the date of adoption. Existing travel clubs may continue to operate without a certificate after the effective date of these rules until December 1, 1968. If an application for a certificate is made by that date they may continue to operate pending action on the application. In addition, in order to avoid disruption of their operation only a limited number of the operating rules will be applicable until February 1, 1969, unless a certificate is issued or denied before that date.

Due to the substantial differences between the basic organization of a commercial operator and that of an air travel club, the rules governing the certification process have been completely rewritten. The other provisions of Part 121 that are applicable to commercial operators of large aircraft have been incorporated by reference with some deletions and minor changes as specifically set forth in Subpart D of Part 123.

Upon consideration of the comments received in response to Notice 67–27, Parts 43, and 91* of the Federal Aviation Regulations are amended and a new Part 123* is added to Subchapter G, effective October 14, 1968.

These amendments are issued under the authority of sections 313(a), 601(a), and 607 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421(a), and 1427).

NOTE: The recordkeeping and reporting requirements contained herein have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

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*Parts 91 and 123 are published separately.

Amendment 43–9

Critical Rotorcraft Components

Adopted: September 10, 1968 Effective: October 17, 1968

(Published in 33 F.R. 14104, September 18, 1968)

The purpose of these amendments to Parts 21, 27, 29, 43, 45, 91 and 127 of the Federal Aviation Regulations is to (1) permit rotorcraft manufacturers to adopt failsafe fatigue design practices for certain portions of the flight structure on condition that related fatigue crack detection procedures and inspection and inspection intervals are approved under the required fatigue evaluation as part of the type design and placed in a separate section of the rotorcraft maintenance manual, (2) require that the replacement times of certain critical components be similarly approved and placed in the separate section of the maintenance manual, (3) require that this section of the manual be referenced by placard in the rotorcraft, and (4) specifically require operators and maintenance personnel to comply with this section of the maintenance manual. The amendments will also require manufacturers to make certain revisions of the rotorcraft maintenance manual available to operators and require identification of certain critical components.

These amendments are based on a Notice of Proposed Rule Making (Notice No. 67–44) published in the Federal Register on October 11, 1967 (32 F.R. 14106).

A number of comments were received in response to Notice No. 67–44, most of which were in agreement with the proposal. The more pertinent of the comments that raised questions together with the changes in the proposal resulting therefrom are discussed hereinafter.

In view of the new sections that were proposed, one commentator suggested that existing §§ 27.307(a) and 29.307(a) be clarified by indicating that the structural analysis used in connection with proof of structure, be permitted to be either static or fatigue. The FAA agrees that such a change would more fully express the intent of the rule yet not imply a change in past practice in which fatigue evaluation has generally involved testing. The sections have been amended accordingly.

As previously stated in the preamble of the Notice, the standards of new §§ 27.571, 29.571, 27.1529 and 25.1529 are intended to preserve the design objectives stated in Notice 65–42, Airframe Proposal 8, except for clarifying changes.

One commentator stated that use of the word "component" in the proposed §§ 27.571 (a) and 29.571(a) could be interpreted as meaning that the entire fuselage, for example, and most of its elements are critical so that a formal fatigue evaluation would be required to be performed on each frame, stringer, panel, or combination. However, since not all parts of a flight structure, such as the fuselage, are likely to be critical in fatigue, it was suggested that the requirement be clarified to call for evaluation only of those considered critical. The FAA is in substantial agreement for it was not intended to require detailed evaluation of a portion of the structure for which no significant fatigue loading exists. The paragraph has been amended, therefore, to delete the word "component" and indicate that it is the critical portion of the flight structure that must be identified and evaluated. A further recommendation that the paragraph be amended to be applicable to failures which "would" be catastrophic rather than those which "could" be catastrophic has been rejected since this would imply that doubtful areas need not be included in the fatigue evaluation. In connection with the requirement for fatigue evaluation of flight structure, it was suggested that the intent be clarified so as not to extend the fatigue evaluation to non-critical parts. While the FAA agrees with the objective of this comment, it is believed that the revisions to § 27.571(a) and § 29.571(a) discussed above sufficiently delienate the applicability without introducing the new term "noncritical".

As they were proposed, §§ 27.571(a)(3)(i) and 29.571(a)(3)(i) indicated that loads and stresses need be subjected to inflight measurement only throughout the range expected in operation where such range is less than the range of design limitations stated in §§ 27.309 and 29.309. It is apparent that such a generally stated alternative is at variance with other requirements inasmuch as design weight, rpm, airspeeds, and c.g.

limits are attainable without extreme maneuvers and are, in general, explored in other phases of the flight test program. With maneuvering load factors, the situation is otherwise, however, and since it would be unrealistic in connection with fatigue evaluation to require measurement of loads and stresses at the limit maneuvering load factors, the alternative of using operational rather than design limits would there be applicable. To remove any ambiguity with reference to weight, rpm, airspeed, and c.g. limits, §§ 27.571(a)(3)(i) and 29.571(a)(3)(i) have been reworded to make it clear that it is for only maneuvering load factors that inflight measurements may be made with reference to values expected in operation.

The FAA agrees with a comment that the intent of §§ 27.571(d)(2) and 29.571(d)(2) is to distinguish the lesser of the limit and maximum attainable loads rather than designate one as being applicable. The parenthetical expression in the two sections has been amended to state "whichever is less".

Pointing out that some procedures are so simple and well known that actual demonstration should not be required, one commentator objected to the requirement that all procedures in the "Airworthiness Limitations" section of the Rotorcraft Maintenance Manual be shown to be practicable. Since the need for an actual demonstration should be determined on an individual basis, the requirement for a showing has been eliminated in §§ 27.1529(a)(2)(ii) and 29.1529(a)(2)(ii).

One of the comments received in response to the Notice requested that the FAA specifically countermand the "administrative procedures" specified in the preamble. In this connection, the commentator referred to the preamble discussions in which the FAA indicated that if safety requires that the airworthiness limitations in the Rotorcraft Maintenance Manual must be made more severe, appropriate changes to the manual would be made by airworthiness directives. While the comment objected to the general use of airworthiness directives, it did indicate acceptance to telegraphic airworthiness directives for use in this regard.

As pointed out in the preamble to Notice 67–44, the inspection intervals, replacement times and related procedures set forth in the "Airworthiness Limitations" section of the Rotorcraft Maintenance Manual are limitations on the original approval of the type design. Thus, any changes to these limitations are, in effect changes to the type design. In recognition of this fact, airworthiness directives have long been used by the FAA to prescribe changes to the service life limits for a product. However, it should be made clear that since the replacement times, inspection intervals, etc., would now be placed in a maintenance manual, the manufacturer's changes to the manual and subsequent dissemination to all operators would serve the purpose originally served by airworthiness directives. However, as the FAA pointed out in the preamble discussions, in those instances where a safety necessity exists, the airworthiness directive is the means by which the FAA can assure that the operators have the revised limitations. Moreover, an airworthiness directive would also be required in those instances in which a manufacturer failed to issue revisions to the limitations which the FAA considered necessary in the interest of safety. Only in the latter instance would the FAA make changes to the manual by airworthiness directive. As the commentator correctly noted, approved revisions to the airworthiness limitations section of the maintenance manual have had the same legal effect as the original limitations and the issuance of airworthiness directives with respect to such limitations would not be inconsistent with that fact.

The FAA agrees with one final suggestion that service experience may be used in certain instances in a resubstantiation of the flight structure, as, for example, for a relaxation of a replacement time or inspection interval in the "Airworthiness Limitations" section of a Rotorcraft Maintenance Manual. It must be recognized, of course, that time extensions for parts, the failure of which would be catastrophic, cannot be based solely on failure rates or absence of failures in service. However, it is intended to permit appropriate use of service experience in reevaluating flight structure in accordance with §§ 27.571 and 29.571. In this connection, laboratory tests might be made on parts that have been used in service to determine whether the original assumptions were overly conservative.

Interested persons have been afforded an opportunity to participate in the making of this amendment, and due consideration has been given to all matter presented.

This amendment is made under the Authority of sections 313(a), 601, 603, 604, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1423, 1424, and 1425).

In consideration of the foregoing, Parts 21, 27, 29, 43, 45, 91, and 127* of the Federal Aviation Regulations are amended effective October 17, 1968.

*Parts 21, 27, 29, 45, 91, and 127 are published separately.

Amendment 43–10

Mechanical Work Performed on U.S. Registered Aircraft by Certain Canadian Persons

Adopted: October 24, 1968 **Effective: November 29, 1968**

(Published in 33 F.R. 15988, October 31, 1968)

The purpose of these amendments to Parts 43 and 91 of the Federal Aviation Regulations is to extend to authorized employees of approved Canadian companies the privileges presently granted Canadian Aircraft Maintenance Engineers; to authorize certain Canadian individuals to perform 100-hour inspections; to clarify the provisions for approval of Canadian performed mechanical work; and to permit operation of an aircraft following a 100-hour inspection performed by the authorized Canadian persons.

These amendments were proposed in Notice of Proposed Rule Making (Notice 68-6) published in the Federal Register on March 12, 1968 (33 F.R. 4420).

One of the comments stated that the proposal was acceptable provided the persons performing the inspections and mechanical work other than holders of Canadian Aircraft Maintenance Engineer licenses, have qualifications which are equivalent to the U.S. standard and requirement for similar work. This comment obviously has reference to a Canadian Approved Inspector. The FAA is satisfied that all the persons authorized to perform these tasks have such qualifications. In this connection, the Canadian Department of Transport (DOT) has advised the FAA that the principal difference between an "Approved Inspector" and a "Canadian Aircraft Maintenance Engineer" (who is authorized by the current provisions of § 43.17 to perform maintenance, preventive maintenance, and alterations on U.S. registered aircraft in Canada) is that the Approved Inspector certifies work under a company approval number instead of a personal license number. In fact, the Canadian DOT advises that employees of an Approved Company who hold signing authority (Approved Inspectors) are classed as Aircraft Maintenance Engineers.

There were other comments that endorsed the proposal and recommended that the Canadian authorities be authorized to perform the required work on U.S. airplanes in Canada necessary for the continued airworthiness status of these airplanes (i.e., the performance of the annual inspections required by Part 91). While these recommendations involve substantive changes to the present requirements that go beyond the scope of Notice 68-6, it should be noted that the purpose of the proposal is to provide for a more uniform administration of the reciprocal arrangement between Canada and the United States. In this connection, the Canadian Department of Transport does not permit U.S. certificated mechanics to perform the yearly inspections required for renewal of Canadian airworthiness certificates.

The Notice also proposed that performance of mechanical work be conditioned upon the maintenance record entries being made in accordance with § 43.9 of Part 43. That section requires, in part, that major repairs and major alterations be entered on a form and the form disposed of in the manner prescribed in Appendix B to Part 43. The requirement in Appendix B that a copy of the form be forwarded to the local FAA Flight Standards District Office is not appropriate or applicable to work performed in Canada on U.S. registered aircraft. The form containing the information on major repairs and major alterations should be forwarded to the Federal Aviation Administration, Aircraft Registration Branch, P.O. Box 25082, Oklahoma City, Oklahoma 73125. In addition, it should be made clear that all of the FAA Form 337 must be completed, including the portion covering approval for return to service prior to the time it is forwarded to the

FAA. Therefore, a new paragraph (c) has been added to Appendix B covering major repairs and major alterations performed in accordance with § 43.17. Since this is a clarification that imposes no additional burden on any person, further notice and public procedure thereon is unnecessary.

Interested persons have been afforded an opportunity to participate in the making of this amendment. All relevant matter submitted has been fully considered.

In consideration of the foregoing, Parts 43 and 91* of the Federal Aviation Regulations (14 CFR Parts 43 and 91) are amended effective November 29, 1968.

This amendment is made under the authority of section 101(7), 313(a), 601, and 610 of the Federal Aviation Act of 1958 (49 U.S.C. 1301(7), 1354(a), 1421, 1423, and 1430).

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* Part 91 is published separately.

Amendment 43–11

Content, Form, and Disposition of Maintenance and Related Records

Adopted: September 8, 1969 **Effective: October 16, 1969**

(Published in 34 F.R. 14424, September 16, 1969)

The purpose of these amendments to Parts 43, 121, and 127 of the Federal Aviation Regulations is to remove from Part 43 the requirements concerning the content, form, and disposition of maintenance and related records for the certificated air carriers and the commercial operators of large aircraft and to set forth such requirements in Parts 121 and 127, as applicable. In addition, these amendments revise the recording requirements for major repairs and major alterations and eliminate the requirement that for retired aircraft those records must be retained past the date of cancellation of the registration certificate.

These amendments are based on a notice of proposed rule making (Notice 68–35) published in the Federal Register on December 20, 1968, (33 F.R. 19026). While the comments received in response to the Notice generally concurred with the proposal to transfer the maintenance recording requirements and the recordkeeping requirements from Part 43 to Parts 121 and 127, a number of comments were directed to the substance of those proposed requirements. Except for minor editorial changes, and except as specifically discussed hereinafter, these amendments and the reasons therefor are the same as those contained in Notice 68–35. This rule making action primarily involves a relocation of existing regulations. However, the FAA now has under study detailed amendments designed to update the recordkeeping requirements of Parts 121 and 127 of the Federal Aviation Regulations.

One comment pointed out that throughout the proposal and in the present regulation, liberal use is made of the word "all" as in "all maintenance," "all records," etc., and requested that the word "all" either be deleted or changed to "all meaningful" since "all," interpreted literally means everything. The word "all" in the proposal was intended to be all inclusive and it was used in order to clarify, but not to change, the existing rules. The proposal clearly stated the requirement that a record must be made of all maintenance. The substitution of the words "all meaningful," would, therefore, not be appropriate since it would not express the requirement intended by the FAA. The commentator also suggested that the term "rebuilding" be defined in Part 1 of the regulations. In that connection, it should be noted that the FAA has proposed such a definition in Notice 69–10, which was published in the Federal Register on March 20, 1969 (34 F.R. 5440). In addition, the commentator noted that proposed §§ 121.380 and 127.141 require a record of all maintenance, rebuilding, and alteration on aircraft (including airframes, aircraft engines, propellers, appliances, or part thereof), but that the words "or part thereof" do not appear in the related provisions in proposed §§ 121.698 and 127.308. This was an oversight in drafting the proposal and for the purpose of

consistency and clarity, the related provisions in the amendments to §§ 43.9(b), 121.698, and 127.308, have been revised accordingly.

In the notice it was proposed to specifically require that a record be made of all airworthiness directive (AD) compliance. One comment stated that since maintenance, as defined in Part 1, includes inspection and repair and since maintenance and alteration records are already required to be made, requirement for the preparation of records showing compliance with ADs is redundant. The FAA agrees and the proposed amendments have been changed to remove the requirement for such records.

The notice also proposed to add new §§ 121.698(a)(1) and 127.308(a)(1) to require that the record of each major repair and major alteration, and each rebuilding required by §§ 121.380 and 127.141 be retained until such work is "superseded by like work" or until the product on which the work was performed is sold or retired. One comment objected to the phrase "superseded by like work" and stated that the words "repeated or superseded by other work" are more descriptive and the term "other" would include "like." Moreover, it was suggested that the use of the term "other" would cover the situation of a work content change which would still supersede the previous work. The FAA agrees and since this same language is used in other provisions of the proposal, the requirement has been revised as suggested. With respect to this same requirement another commentator stated its belief that the proposal could be broadly construed to eliminate former records of work on components that are not affected by "like work" on the larger portion of the airframe, and that this could destroy the complete history of an appliance or of a subsystem and preclude a complete review of an individual system at any time. The current regulations do not require the retention of the complete history of any appliance or subsystem of the aircraft, and such a requirement was not proposed in Notice 68–35. Sections 121.698 and 127.308, as adopted herein, make it clear that the record of maintenance on an appliance must be retained until that maintenance is superseded or repeated by other work, either to the appliance or, as the commentator states, to "a larger portion of the airframe."

One comment objected to the proposed amendments requiring that certain maintenance and alteration records be retained for one year after the product on which the maintenance or alteration was performed is placed in service. The comment pointed out that the rule now specifies one year from the date the product was approved for return to service and that this change will require expensive and unnecessary data changes. The comment further noted that parts that are approved for return to service and are placed in stock are tagged as to whether or not they are serviceable and this includes a date upon which they were approved for return to service. Upon further consideration, the FAA agrees that the term "placed into service" does not clearly indicate the objective of the requirement. However, because of the confusion in the past over the meaning of the requirement in the present regulation, it is not considered appropriate to continue using the term "approved for return to service" in connection with record retention requirements. As the comment indicates, the present rule has been administered so that the one year retention period starts when the specified maintenance or alteration is performed. This is what the FAA intends and the proposed regulation has been changed accordingly.

One commentator recommended that in lieu of requiring, as proposed in §§ 121.689(a)(2) and 127.308(a)(2), that records of the "last complete overhaul" of airframes, engines, and propellers be retained, that the records of "each last completed work element of the approved overhaul program" should be retained. The commentator indicated that it did not intend that its recommendation change the rule, but that it was for the purpose of clarification of the requirement for retention of "block overhaul" records. The FAA does not agree that the suggested change would be as clear or as understandable as the proposal. The record of the "last complete overhaul" would include all the records necessary to show a complete overhaul of airframe, aircraft engine, propeller, or appliance irrespective of whether the overhaul program established by a particular certificate holder provides for overhauling the entire airframe, aircraft engine, propeller, or appliance at the same time or provides for overhauling them "in blocks" or at different times. As pointed out by the commentator, the work content in the various blocks is constantly changing and an item of work may not be repeated in the same block. When this occurs or the air carrier changes from one type overhaul pro-

gram to another, proper record adjustments must be made to ensure that the last overhaul record of these items is retained. The retention of the "last completed work element of the approved overhaul program" would not convey the intent of the regulation.

One comment objected to proposed §§ 121.698(b) and 127.308(b) insofar as they retain the present requirement for a record of the last overhaul of appliances, and increase to two years the present one year record retention requirement for all maintenance and minor alteration records. The commentator stated that records of overhaul work accomplished over two years ago and records of maintenance and alterations performed more than one year ago have no real use. The FAA does not agree that for appliances the record of the last overhaul has no real value after two years. However, upon further consideration of the proposed two-year retention requirement, the FAA has determined that appliances should be treated the same as airframes, aircraft engines, and propellers. In this connection, it should be noted that with respect to major repairs and major alteration, the proposal would have required retention only for two years. The FAA does not now consider that such a change would be in the interest of safety. In view of the comments received, the proposed amendments concerning the retention of appliance records have not been adopted. Instead, the appliance record retention requirements have been incorporated into the requirements applicable to airframes, aircraft engines, and propellers. As now written the regulation is substantially the same as the current requirement. Records of minor repair and minor alteration for appliances need only be kept for a maximum of one year and records of major alterations and major repairs must be retained until they are repeated or superseded by other work or the appliance is sold or retired.

One of the comments strongly urged that the amendment not require the transfer of appliance maintenance records when an appliance is sold. The commentator recommended that the records be kept by the seller for a specified time and made available, upon request, to the new owner or operator. The FAA does not agree. While the FAA recognizes that the recording system which an air carrier elects to use may be such that it is inconvenient and time consuming to assemble the records in the form requested by the new owner, the FAA is nevertheless aware that it is necessary in the interest of safety to provide the new owner or operator with all the maintenance and appliances records necessary for the proper maintenance of its aircraft without delay.

The proposed §§ 121.380(c) and 127.141(c) permit the transferee of records to elect to receive "electronic data processing" records in coded form. However, the FAA has now determined that there are coded records other than electronic data processing records that may be used and the proposal has been revised to cover any coded records.

In consideration of the foregoing, Parts 43, 121 and 127* of the Federal Aviation Regulations (14 CFR Parts 43, 121 and 127) are amended effective October 16, 1969.

These amendments are made under the authority of sections 313(a), 601, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, and 1425), and of Section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

NOTE.—The recordkeeping and reporting requirements contained herein have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

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* Parts 121 and 127 are published separately.

Amendment 43–12

Air Taxi Operations With Large Aircraft

Adopted: September 8, 1969 Effective: November 15, 1969

(Published in 34 F.R. 14423, September 16, 1969)

The purpose of these amendments is to require air taxi operators using large aircraft to comply with the rules of Part 121 of the Federal Aviation Regulations that are

applicable to domestic, flag, or supplemental air carriers, as appropriate, and to give these air taxi operators the same maintenance privileges that air carriers presently have under Parts 43 and 121.

These amendments are based on a notice of proposed rule making (Notice 68–16) published in the Federal Register on July 25, 1968, (33 F.R. 10578).

Several comments on the Notice pointed out the inflexibility of the proposed requirement that air taxi operators conducting scheduled operations with large aircraft comply with the rules applicable to domestic air carriers. These comments expressed the view that it would not be practicable for small scale or certain routine operations to conform to the domestic air carrier rules. We agree that the rules should be made more flexible. Accordingly, the amendment has been drafted to require all air taxi operators with large aircraft to conduct operations in accordance with the rules of Part 121 applicable to supplemental air carriers. In addition, the Administrator may issue operations specifications requiring those operators to conduct operations in accordance with the domestic or flag air carrier rules, in lieu of the supplemental air carrier rules, if he finds that compliance with those rules is necessary to provide an appropriate level of safety in air transportation.

The requirement of compliance with the supplemental air carrier rules was changed from the Notice primarily to reflect the present general scope of operations conducted by air taxi operators currently using large aircraft. However, provision has been made for the Administrator to require compliance with the rules usually applicable to domestic or flag air carriers, since a particular air taxi operation may expand and become more complex in the future by virtue of route extensions authorized by the Civil Aeronautics Board, increased fleet operations, the addition of IFR operations to present VFR routes, or other factors. Under these circumstances, the Administrator may find compliance with those rules necessary to provide an appropriate level of safety. This provision would also cover operators not yet certificated whose operations are proposed to be more extensive than the present general scope of air taxi operations.

Section 135.2(a) requires an air taxi operator of large aircraft to comply with Subpart L of Part 121, "Maintenance, Preventive Maintenance, and Alterations." Such an operator will have to maintain his large aircraft in accordance with a continuous airworthiness maintenance program and his maintenance manual. That operator also is authorized by § 135.2(b) to perform and approve maintenance, preventive maintenance, and alterations on small aircraft, including those operated by another air taxi operator of large aircraft, as provided in § 121.379 of Part 121. However, for administrative reasons, it is considered essential that small aircraft being maintained under the requirements of Part 121 be readily identifiable. Since the aircraft can best be identified by listing them in the operations specifications by registration number, proposed § 135.2(b) has been revised to reflect this requirement.

The holder of an air taxi/commercial operator (ATCO) certificate currently authorized under Part 135 to use large aircraft in air taxi operations is given three months from the effective date of this amendment to apply to the FAA for operations specifications issued under Part 121. After making timely application, the certificate holder may continue using his Part 135 authorization until Part 121 operations specifications are issued or denied.

It is recognized that additional time will be required by some ATCO certificate holders currently operating large aircraft in order to achieve compliance with certain of the equipment requirements in Part 121. Accordingly, a provision has been added by this amendment to authorize deviations to be granted in the Part 121 operations specifications with respect to large aircraft which do not meet certain of the Part 121 equipment requirements.

The large aircraft for which a deviation is granted must be identified in the operations specifications of the air taxi operator. Furthermore, a deviation may be granted for a period of not more than 12 months from the effective date of this amendment. We believe this period of time to be reasonable and adequate to enable an ATCO certificate holder to achieve compliance with the Part 121 equipment requirements specified in this amendment. This authority to deviate will only be granted to those ATCO certificate holders who have Part 135 operating authority on the effective date of this amendment

to use large aircraft in air taxi operations. Those persons not authorized to operate large aircraft on the effective date of this amendment are required to meet all of the applicable Part 121 requirements before operations specifications are issued under Part 121 for the use of large aircraft.

One of the comments received pointed out that the applicability of emergency evacuation requirements in § 121.291(a) of Part 121 to on-the-water situations is inappropriate. The FAA agrees and has added a provision to § 135.2(c) to make it clear that compliance with § 121.291(a) is not required for large seaplanes used in air taxi operations.

Another change from the Notice has been made to make language used in the various Parts consistent. Air carriers have a "continuous airworthiness maintenance program," but § 91.161(b) speaks only to a "continuous airworthiness program." That section is being amended for the sake of consistency, by the addition of the word "maintenance" to the phrase.

Interested persons have been afforded an opportunity to participate in the making of these amendments and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, Parts 43, 91, and 135* of the Federal Aviation Regulations are amended, effective November 15, 1969.

These amendments are issued under the authority of sections 313(a), 601, 604, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1424, 1435), and of section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Amendment 43–13

Deletion of FAA Recording Requirements

Adopted: May 11, 1970 **Effective: June 15, 1970**

(Published in 35 F.R. 7641, May 16, 1970)

The purpose of this amendment to Part 43 of the Federal Aviation Regulations is to amend § 43.11 by eliminating the requirement for execution of FAA Form 8320–3—Aircraft Use and Inspection Report (now referred to in Appendix C as FAA Form 3350).

Section 43.11(b) requires each person performing an annual or progressive inspection to complete the FAA Form and dispose of it as prescribed in Appendix C. Appendix C requires each person performing an annual or progressive inspection to execute an FAA Form 8320–3 (referred to in the regulations as FAA Form 3350) and submit that form within a prescribed time to the appropriate FAA District Office. If the annual inspection reveals that the aircraft is in an unairworthy condition, that person must also submit, together with the aforementioned form, a list of discrepancies to the FAA and a list of discrepancies to the owner or lessee of the aircraft.

Form 8320–3 is divided into three sections covering the identification of the aircraft to be inspected, information concerning the activity of that aircraft, and the inspection report.

It has been determined by the FAA that the information contained in FAA Form 8320–3 concerning the identification and the activity of an aircraft does not meet the needs of the FAA. Thus, in Amendments 47–10 and 91–72, effective March 7, 1970, the FAA requests that identification and activity information involving the make, model, registration, and serial number of the aircraft and the name and address of the owner be provided on new AC Form 8050–73. Thus, with the exception of the inspection report, FAA Form 8320–3 now serves no useful purpose. Moreover, the FAA has determined that required information concerning annual and progressive inspections can be obtained from permanent maintenance records for the aircraft kept by the registered owner or operator of the aircraft and from records that are required to be kept by certificated repair stations. Therefore, since there is no longer any need at all for the majority of the data covered by FAA Form 8320–3, Appendix C of Part 43 which is devoted entirely to recording of annual and progressive inspections on the FAA Form 8320, will be revoked.

Although FAA Form 8320-3 (FAA Form 3350) will no longer be required, the FAA still needs information on any unairworthy feature of an aircraft. Therefore, the listing of discrepancies now required in § 43.11(b) and in paragraph (b)(2) of present Appendix C will be retained although the form of the document containing the listing is left to the discretion of the person performing an annual inspection.

Since this amendment relieves a restriction and imposes no additional burden on any person, notice and public procedures hereon are unnecessary.

In consideration of the foregoing, Part 43 of the Federal Aviation Regulations is amended, effective June 15, 1970.

This amendment is made under the authority of sections 313(a) and 601 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a) and 1421), and of section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

NOTE.—The reporting and/or recordkeeping requirements contained herein have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

Amendment 43-14

Appliance Major Repairs

Adopted: July 11, 1972 **Effective: August 18, 1972**

(Published in 37 F.R. 14291, July 19, 1972)

The purpose of this amendment to Appendix A of Part 43 of the Federal Aviation Regulations is to classify the calibration and repair of instruments and the calibration of radio equipment as major appliance repairs.

This amendment was proposed in Notice 70-2, published on January 10, 1970 (35 F.R. 386). The majority of the comments received in response to Notice 70-2 favored the adoption of the proposal. However, a number of comments were received that exceeded the scope of the notice and therefore, are not considered in connection with this amendment. Nevertheless, these comments are appreciated and they will be considered in connection with future rule making actions. Finally, several commentators objected to certain aspects of the proposed rule. These comments are discussed below.

A number of the comments indicated a difference of opinion as to the work functions that constitute calibration. Calibration involves the airworthiness of an instrument or item of radio equipment and includes those work functions which cause the instrument or radio equipment to perform within specified tolerances. It requires special skills and knowledge and the use of test equipment. Calibration procedures normally require the instrument or radio case to be opened for internal calibration or repair. It does not include those adjustments of instruments and equipment which are accomplished using readily accessible and simple adjusting means, including the adjustments that are normally accomplished during cockpit checklist procedures, the adjusting of the zero setting of meter scales, and simple testing to determine error in instrument performance or operation. These work functions do not have an appreciable effect on the airworthiness of the instrument or equipment and do not require special skill and knowledge and the use of test equipment.

Contrary to the belief of one commentator, the proposal does not prevent an operator from adjusting or "swinging" magnetic compasses. The ground swinging of compasses to determine and record magnetic deviation does not involve those work functions which constitute calibration. However, if a magnetic compass needs additional fluid to perform properly it is defective, and the necessary opening of the case, replenishing of the fluid, and testing of the compass will require calibration. These work functions constitute a major appliance repair under both the present regulations and the proposal.

One comment suggested that the calibration and repair of non-essential instruments should not be classified as major repairs. Another comment recommended that only the calibration of primary flight and primary engine instruments be classified as major re-

pairs. The FAA does not agree with these comments. Regardless of the intended use of an instrument, its calibration has long been considered a basic part of instrument repair, and the FAA believes that the calibration and repair of all instruments should be classified as appliance major repairs regardless of their intended use.

Another comment objected to the proposal on the grounds that it would place an additional recordkeeping burden on Part 121 operators and would necessitate setting up separate records to record instrument repairs. Part 121 certificate holders are required to make a record of all maintenance performed on appl ances regardless of whether that maintenance is classified as major or minor repairs. Calibration is a basic function of instrument repair procedures that have been in general use by air carriers for many years and classifying instrument calibration as a major repair should not alter an operator's recordkeeping system in any material respect.

One commentator, noting that the term "radio equipment" is not defined in the regulations, suggested that the term "communications equipment" would be more appropriate since it covers both navigation and voice communications equipment. The FAA does not agree. The term radio equipment includes navigation and communications equipment as well as weather radar and all other equipment that involve the transmission and reception of radio waves. The calibration of all radio equipment, regardless of its function, is classified as an appliance major repair under the proposal.

In consideration of the foregoing, subparagraphs (b)(4)(i) and (ii) of Appendix A of Part 43 of the Federal Aviation Regulations are amended, effective August 18, 1972.

This amendment is made under the authority of sections 313(a), 601, and 603 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, and 1423), and of section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Amendment 43–15

Large and Turbine-Powered Multiengine Airplanes

Adopted: July 17, 1972 **Effective: October 23, 1972**

(Published in 37 F.R. 14758, July 25, 1972)

The purpose of this amendment is to add a new Subpart D to Part 91 prescribing general operating rules for large or turbojet-powered multiengine airplanes and an inspection program for large and turbine-powered multiengine airplanes (turbopropeller and turbojet-powered). The inspection program also applies to turbine-powered multiengine airplanes operated by the holder of an ATCO certificate under Part 135.

Interested persons have been afforded the opportunity to participate in the making of these regulations by a Notice of Proposed Rule Making issued as Notice 71–32 on October 7, 1971 (36 F.R. 19507). Approximately 275 comments were received from various individuals, aeronautical associations and government agencies in response to that Notice. The comments have been very helpful in resolving the many issues involved in the formulation of this final rule.

Comments received from the National Business Aircraft Association (NBAA) were directed to two aspects of the Notice. The kind of operations that could be conducted under § 91.181 of the proposal, and the operations and inspection rules set forth in §§ 91.183–91.219. With respect to the first aspect of the rules, NBAA recommended changes in the applicability of Subpart D to include a fuller use of aircraft in private carriage. If a fuller use of the aircraft is permitted, the NBAA favors the safety rules set forth in §§ 91.183–91.219, with certain changes described in detail herein.

Comments received from other associations and government agencies ranged from a qualified opposition to a complete agreement with the proposed rules. For example, the Aircraft Owners and Pilots Association believes the rules should apply to a corporate operator, but not to a private operator. The General Aviation Manufacturing Association believes the rules should apply to airplanes having 10 or more passenger seats since the 12,500 pound dividing line is no longer valid. The Air Transport Association believes the rules should only apply to operators of aircraft who do not hold an air carrier operating certificate, and ferry flights, training flights, check flights, etc., conducted by the holders of those certificates should be excepted from the proposed rules. The National Air Transportation Conference believes the rules should apply only to passenger-carrying aircraft. At the other end of the spectrum, the Air Line Pilots Association and the Chicagoland Business Pilots Association support the proposed rules as a step toward improving air safety for all operators. The National Transportation Safety Board favors the rules, while the British Air Registration Board recommends that the takeoff runway requirements of proposed § 91.205 be replaced with a rule similar to § 91.37(b) and (c).

Approximately 250 comments were received from individuals and corporations. While most of the comments received from the corporate operators endorsed the position of the NBAA, some of those comments recommended different or additional changes. A few commentators were opposed to all the proposed operating or safety rules, except those rules requiring flying equipment and flight attendants for passenger-carrying aircraft.

Many of the commentators expressed the opinion that the subpart should not apply to small turbopropeller-powered multiengine airplanes. It is their opinion that some small supercharged reciprocating engine-powered airplanes have performance capabilities similar to small turbopropeller-powered airplanes. Yet, under the proposed rules those reciprocating engine-powered airplanes would not be required to be operated under the provisions of Subpart D. Upon further consideration we are persuaded that there is no demonstrated need at this time to require small turbopropeller-powered multiengine airplanes to be operated under the rules of Subpart D. This decision, however, does not apply to the inspection program requirements which, in our opinion, should be

required for all turbine-powered multiengine airplanes (turbopropeller- and turbojet-powered airplanes) as proposed in the notice. Section 91.181(a) as adopted herein reflects this change in the applicability of Subpart D.

For many years the term "compensation," as used in the definition of a commercial operator and the applicability provisions of Part 121, has been construed in its legal sense which does not limit that term to an element of profit, but includes any reimbursement for the expenses for the operation of the aircraft. Comments received from the corporate operators strongly urged a change in that policy. They contend that in most cases involving wet lease agreements (lease of an aircraft with flight crew) a charge is made for the operating expenses of the aircraft solely for the purpose of complying with the requirements of the U.S. Internal Revenue Service—not for the purpose of making a profit. Therefore, in response to the request for comments in regard to time sharing and interchange agreements, these commentators urged that a monetary charge be permitted under either of these arrangements, so long as there is no profit motive involved in the charges made.

As stated in the preamble to NPRM 71–32 the decision to proceed with the upgrading of Part 91 for large and turbine-powered multiengine airplanes is an important threshold step in the FAA policy to remove, to the extent possible, those differences in the safety standards that a primarily economic in nature and result in unnecessary restrictions or limitations on aircraft operators. In accordance with that policy the need for different, or additional safety standards for corporate operations should be resolved on the basis of safety, rather than economics or juristic semantics. Safetywise, we have determined that neither the relationship of the corporations nor the type of compensation received for the services rendered should be relevant or controlling under the standards of the new Subpart D for the various corporate kinds of operations that do not involve common carriage.

In order to make this change in policy clear to all interested persons, § 91.181(b) includes a list of the kinds of operations that may be conducted under Subpart D. In addition, § 91.181(c) of Subpart D expressly provides that charges covering the normal operating expenses of the aircraft and salary of the crew may be made under a time sharing or interchange agreement as defined in that section. This policy also applies to a corporation regardless of its relationship, if any, to the corporation for which the carriage is conducted. Accordingly, the application of Subpart D to a corporate operator will no longer be dependent upon whether that operator is a parent or subsidiary corporation, or a member of a conglomerate. It should be noted, however, that if a corporation is established solely for the purpose of providing transportation to the parent corporation, a subsidiary, or other corporation, the foregoing policy does not apply. In that case, the primary business of the corporation operating the airplane is transportation and the carriage of persons or goods for any other corporation, for a fee or charge of any kind would require the corporation operating the airplane to hold a commercial operator certificate under Part 121 or 135, as appropriate.

Some of the commentators requested expansion of the applicability of Subpart D to permit a jointly owned airplane to be operated under the safety standards of that subpart when the flight crew is furnished and employed by one of the joint owners. In regard to such operations we have concluded that if the flight crew is employed and furnished by one of the joint owners and continues in the employ of that owner when the airplane is used by another joint owner, it will be presumed that the joint owner employing and furnishing the flight crew is the operator of the airplane within the meaning of the Federal Aviation Regulations. Unless otherwise agreed to by the owners, he is responsible for compliance with the safety regulations applicable to that flight, even though the joint owner using the airplane at the particular time has the authority to specify the destination of the flight and the persons or cargo that may be carried on that flight. Safetywise, we perceive no reason under those circumstances to require the joint owner, as the operator of that airplane, to hold a commercial operator certificate. Accordingly, § 91.181(c) has been amended to permit such operations to be conducted under Subpart D. If any charge is made by the operator in excess of the normal operating expenses of the flight, including fuel, oil, hangar and landing fees, and salary of the crew, the operation, of course, may not be conducted under Subpart D. When

such charges are made, the operator must hold a commercial operator certificate and conduct the operation under the provisions of Part 121 or 135, as appropriate.

The carriage of persons on an airplane for the purpose of selling to them land, goods, or other property (including franchises) was described in the preamble to NPRM 71–32 as a corporate aircraft operation. However, the preamble did not further articulate the FAA policy in regard to such operations when conducted as an incident to the business of the coporation operating the aircraft. In recent years there has been an increase in the use of corporate aircraft for the carriage of prospective customers, especially as an incident to the business of real estate development and sales. It has been the policy of the FAA to permit the corporation to transport those customers on its aircraft without holding a commercial operator certificate, so long as no charge is made for the transportation and common carriage is not involved. It is our opinion that this policy should be continued without change. Accordingly, § 91.181(b)(9) of the rule as adopted herein expressly permits the carriage of prospective customers under the rules of Subpart D. However, no charge of any kind may be made for that carriage, regardless of whether the charge represents the customer's pro rata operating expenses for the flight, or a loss. To permit a charge of any kind for the carriage of the customers would require constant suveillance and time consuming investigations by FAA inspectors to determine if the charge represents an amount that is permitted under the regulations, or is in fact considered compensation as that term is used in the definition of a commercial operator. Moreover, it should be noted that such operations may, under certain circumstances, result in the carriage of persons as a common carrier for compensation or hire. In that event, the person operating the airplane may be required to hold a certificate of public convenience and necessity or other appropriate economic authority from the Civil Aeronautics Board in addition to an air carrier operating certificate from the Administrator.

The preample to NPRM 71–32 stated that a GENOT was issued by the FAA to make it clear that a "manufacturer" or "aircraft sales company" did not need a commercial operator certificate to demonstrate aircraft in flight to a prospective customer when that customer is charged a fee to defray the normal operating expenses of the flight, including fuel, oil, hangar or landing fees, and salary of the flight crew. In our judgment the authorization should be equally applicable to the owner of the aircraft regardless of whether he is a manufacturer or aircraft salesman. For this reason the language of § 91.181(b)(3), as proposed in the notice, did not limit such authorization to a "manufacturer" or "aircraft sales company." Since there were no objections to that proposal, the rule as adopted herein permits such customer demonstrations by the owner of the airplane as well as the manufacturer, or sales company.

Inasmuch as the foregoing policies permit a greater use of corporate aircraft under joint ownership, time sharing, and interchange agreements, it appears desirable to restate herein the FAA policy in regard to the operation of an airplane under those agreements when they constitute a wet lease (the lease of an aircraft with flight crew). When the leessor furnishes both the aircraft and flight crew, there is a presumption that the operational control and safety responsibility for the aircraft remains in the hands of the lessor during the lease agreement and he becomes the operator of the aircraft as that term is used in the Federal Aviation Regulations. This policy conforms with the policy recently adopted by the Civil Aeronautics Board in those cases involving the lease of aircraft with crew by foreign air carriers or other foreign persons (14 CFR Part 218, as amended by ER–716; 36 F.R. 23146).

Whenever the aircraft and flight crew are furnished by separate and unrelated persons, as stated in the preamble to NPRM 71–32, it is presumed that the lessee of the aircraft is the operator of that aircraft within the meaning of the Federal Aviation Regulations. This presumption is not true, however, when the person furnishing the flight crew exercises control over all phases of the operation of the aircraft requiring any aviation expertise, and leaves to the lessee of the aircraft only those decisions normally made as to what and who is transported. Under those circumstances, the National Transportation Safety Board has upheld the FAA's position that the person furnishing the flight crew is the operator of the aircraft.

In an effort to make the parties to a lease agreement more fully aware of their responsibilities, the FAA recently proposed an amendment to § 91.54 of the FAR's that would require a "truth in leasing" clause to be inserted in leases involving certain aircraft (NPRM 71–35; 36 F.R. 20768). Among other things, the truth-in-leasing clause inserted in the lease would identify the person responsible under the lease for the operation of the aircraft, and contain a certification by that person that he understands his responsibility for compliance with the applicable Federal Aviation Regulations. The proposed rule would also require a copy of the lease to be carried in the leased aircraft and made available for review upon request by the Administrator. If adopted, this rule should preclude the unintentional assumption of responsibility for operation of an aircraft by either party to the lease agreement.

In view of the comments received in response to the Notice, another change in the applicability of Subpart D was made. This change involved the carriage of goods or property on an airplane as an incident to a business other than transportation. Although it has been the policy of the FAA to permit a manufacturer to carry his materials from one factory to another for processing into a finished product, that policy did not further permit the carriage of the finished product to a customer or a distributor if a charge, direct or indirect, was made for such transportation. While this limitation rested upon a proper legal interpretation of the term compensation, it is no longer necessary under the safety standards of Subpart D. Accordingly, under the rules as adopted herein, the FAA will permit the carriage of property (other than mail) on an airplane operated by a person in the furtherance of a business (other than transportation), when the carriage is incidental to that business and no charge is made for that carriage in excess of the normal operating expenses of the flight. Athough this change in policy permits a greater use of an airplane as an incident to a business or profession, it does not change the FAA policy in regard to the carriage of goods or property by airplane when such carriage is the primary business of the operator of that airplane. When such carriage is in fact a major enterprise in itself, it may not be conducted by any person unless he holds an operating certificate under Part 121 or 135, as appropriate.

As previously stated, one commentator recommended that the rules in Subpart D should not apply to ferry or training flights conducted by an air carrier or commercial operator holding an operating certificate under Part 121. The language of § 91.181 of the proposed subpart expressly applies to ferry or training flights since those flights are not required to be conducted under the rules of Part 121 or 135 of the Federal Aviation Regulations. If those flights are also excepted from the operating rules of Subpart D, it would result in a dual standard of safety for large airplanes or turbojet-powered multiengine airplanes when passengers or cargo are not carried for compensation or hire. Such a policy is undesirable and would defeat the purpose of the rules prescribed in Subpart D. However, to the extent that a particular rule in Subpart D is not appropriate for a ferry or training flight, the rule includes an exception for those flights.

The recommendation that Subpart D applies to aircraft having 10 or more passenger seats, rather than large airplanes as defined in Part 1 of the Federal Aviation Regulations, goes beyond the scope of the Notice and is not discussed herein.

The descriptive list in § 91.181(b) containing the kinds of operations that may be conducted under Part 91 and Subpart D applies to large and turbojet airplanes. Although this list appears to be equally applicable to small and other airplanes not covered by Subpart D, for the convenience of all operators a separate rule-making action will be initiated to expressly include that list and any changes thereto that are deemed appropriate for such airplanes in Subpart A of Part 91.

Operating rules. In order to facilitate discussion of the safety rules as adopted herein, each rule is listed under a separate heading and discussed in the light of the comments received.

1. *Flying equipment and operating information.* The bulk of the comments received supported the provisions of § 91.183 as proposed. However, two changes have been made to that section. In order to preclude the use of a penlight or other inadequate light as a substitute for the type of flashlight normally carried on an airplane for emergency use, § 91.183(a)(1) has been changed to require a flashlight having at least two size

"D" cells or equivalent. A new paragraph (d) has been added to make it clear that the equipment prescribed in that section is to be used by the pilot in command and other members of the flight crew, when appropriate. Finally, to correct a typographical error in § 91.183(a)(4) as proposed, the comma appearing after the symbol VFR has been deleted. As corrected the equipment specified in that subparagraph applies to "IFR, VFR over-the-top, or night operations."

2. *Familiarity with operating limitations and emergency equipment.* With the exception of approximately seven comments, all comments received supported the provisions of § 91.185 as proposed. Those comments received in opposition to this section were not opposed to the substance of the rule, but the policy of issuing a rule containing what they believe to be a good operating practice. We disagree with such a regulatory policy for those practices that must be accomplished for the safety of the flight; accordingly, the rule is adopted without change.

3. *Equipment requirements: Over-the-top, or night VFR operations.* No substantive comments were received in response to the provisions of § 91.187 and it is adopted without change.

4. *Survival equipment for overwater operations.* Several changes were made to the provisions of § 91.189 in response to the comments received.

The first change involves the substitution of "more than 30 minutes flying time or a horizontal distance of more than 100 nautical miles from the nearest shoreline" for the term "extended over-water operations" (defined in Part 1 of the FAR's to mean a horizontal distance of more than 50 nautical miles from the nearest shoreline).

Comments received in response to the proposal strongly urged the increased distance for general aviation operations. As pointed out in some comments such equipment because of its weight is not kept on board an airplane permanently, but is usually rented and installed in the airplane when needed for a particular flight. Therefore, if the provision is adopted as proposed, the general aviation operators would be unable to use certain offshore routes now designated beyond 50 nautical miles from shore, unless they carried the required survival equipment which, they contend, would place an unnecessary weight restriction on their airplanes for operation over such routes. Moreover, as pointed out by some commentators, section 6.3.3 of Annex 6 to the Convention on International Civil Aviation only requires life saving rafts and survival radio equipment when the flight over water is more than 100 nautical miles from the shoreline for a single engine airplane, and more than 200 nautical miles for multiengine airplanes with one engine inoperative performance. We are persuaded in the light of the comments received to increase the offshore distance from 50 to 100 nautical miles, but such equipment will also be required, regardless of the distance from the shoreline, if the flight is more than 30 minutes flying time from the nearest shoreline.

Paragraph (a) of § 91.189 as adopted herein still requires a life preserver or approved flotation means for each occupant of the airplane when a takeoff is made for a flight over water more than 50 nautical miles from the nearest shoreline. This distance conforms with the requirement for such equipment specified in § 6.3.3 of Annex 6. As used in § 91.189, an approved flotation means includes such means as buoyant seat cushions or other means that meet the requirements of TSO–C72.

To avoid the possibility of an unintentional violation by those pilots who find it necessary to fly over water beyond the distances specified in § 91.189 due to an ATC vector, or route change to avoid adverse weather, the rule requires the equipment only for a planned or intended flight over water beyond the distances specified.

The third change to § 91.189 involves the provision in paragraph (b) requiring the installation of the life rafts and other equipment in conspicuously marked and approved locations. The commentators point out that this requirement is inappropriate for those airplanes carrying equipment which is rented and installed on the airplane only for the duration of a particular trip. Upon reconsideration of that proposal, in the light of the comments received, we agree that the requirement for the stowage of the equipment in an approved location may be eliminated. However, we are not persuaded that the requirement for the conspicuous marking of the location at which the equipment is installed should be changed.

5. *Radio equipment for overwater operations.* For the reasons stated in item 4, the radio equipment requirements of § 91.191 have also been changed to require that equipment for a takeoff of a flight over water that is planned or intended to be conducted over water more than 100 nautical miles or 30 minutes flying from the nearest shoreline.

A new paragraph (c) has been added to the rule as adopted to permit operation of the flight under certain conditions when the specified items of equipment malfunction or become inoperative.

Most of the comments received did not favor the marker beacon receiver required by the proposed § 91.191(a)(4). Upon further review of this requirement the FAA agrees that a requirement for a marker beacon receiver would serve no useful purpose except in those areas where there are adequate marker beacon facilities on the surface. Such facilities do not exist for operations over water.

It is our opinion, however, that a marker beacon receiver should be required for all IFR flights in other areas having marker beacons. Since such a requirement goes beyond the scope of the proposed § 91.191, the FAA intends to cover the substance of such a proposal in a separate rule making action.

In response to the suggestion of one commentator, the term "ground facility" has been changed to "surface facility" because the requirements of that section deal with overwater operations.

6. *Emergency equipment.* Many of the commentators recommended the following changes in the proposed § 91.193:

(a) Require the hand fire extinguisher specified in § 91.193(c)(2) to be located convenient to the flight deck, instead of on the flight deck.

(b) Require the hand fire extinguisher specified in § 91.193(c)(3) on airplanes accommodating more than nine passengers, instead of six passengers as proposed in that section.

(c) Delete the requirement in § 91.193(e) for a crash ax.

Upon further review, the FAA agrees that § 91.193(c)(2) should permit greater flexibility for the physical location of the hand fire extinguisher required by that section. Accordingly, that section has been changed to require one hand fire extinguisher located on or near the flight deck in a place that is readily accessible for use by the flight crew. However, we are not persuaded that the hand fire extinguisher requirement should be modified to require such an extinguisher in the passenger compartment of an airplane that accommodates nine or more passengers, instead of more than six passengers as proposed in the Notice.

The crash ax requirement has been retained in § 91.193(e) for those airplanes accommodating more than 19 passengers. Thus, any airplane for which one or more flight attendants may be required under § 91.215 will be equipped with a crash ax for use in an emergency.

7. *Flight altitude rules.* Most of the commentators urged the FAA to lower the minimum VFR altitude proposed in § 91.195 from 1,000 feet above the surface to 500 feet above the surface. This change, some pointed out, would conform with the minimum altitude of 500 feet prescribed in § 135.91 for air taxi operators. Others recommended that the minimum altitude rule also include an exception for pipeline patrol, aerial surveying, and other operations for which low level flying is necessary. Those comments appear to be based on a misunderstanding of the rule. Under the provisions of § 91.195(b)(2) as proposed and as adopted herein, such operations could be conducted under a waiver issued in accordance with the provisions of § 91.63.

We are not persuaded that the minimum altitude for VFR operations should be lowered to 500 feet above the surface. This is especially true since the subpart applies to large and turbojet-powered multiengine airplanes. Therefore, for the reasons stated in the preamble to the Notice, § 91.195 prescribes a 1000-foot minimum flight atitude for VFR.

8. *Smoking and safety belt signs.* The majority of the commentators expressly favored the provisions of proposed § 91.197. Therefore, for the reasons stated in the preamble § 91.197 is adopted as proposed.

9. *Passenger briefing.* Many of the corporate aircraft operators stated that repetitive briefings of the same passengers in regard to the same airplane are unnecessary and serve no useful purpose. The FAA agrees that repetitive briefings of those passengers who fly with the same pilots in the same airplanes on a frequent or regular basis is unnecessary. It was not intended in the proposed rule to require such repetitive briefings. To make this clear, the language of § 91.199(b) expressly provides that an oral briefing need not be given when the pilot in command determines that the passengers are familiar with the contents of the briefing. This authority of the pilot in command will eliminate the need for repetitive oral briefings to the same passengers.

10. *Carry-on baggage.* Only seven comments were received in opposition to the provisions of proposed § 91.201. The comments stated that in the case of some small turbine-powered multiengine airplanes, suitable compartments would not be available for the stowage of carry-on items such as brief cases and tape recorders used en route by company officials. Since this section only applies to those airplanes having a seating capacity of more than 19 passengers, we preceive no reason why adequate space should not be made available for the stowage of carry-on baggage when that baggage is not being used on the airplane. Accordingly, the rule is adopted as proposed.

11. *Carriage of cargo.* Seven comments were received in general opposition to the provisions of proposed § 91.203. However, the vast majority of the comments received concurred with the rule. For the reasons set forth in the Notice, the rule is adopted herein without change.

12. *Operating limitations: Takeoff limitations for transport category airplanes.* Most of the commentators urged that the rule should give the pilot in command of the airplane final authority to determine whether the length of the runway is adequate to stop the airplane as required by § 91.205. They contend that this authority is necessary since runway gradient and other necessary information may not be available for some airports now used by the general aviation operators. As stated in the preamble to NPRM 71–32, the proposed §91.205 was intended to prescribe takeoff accelerate-stop distance limitations for reciprocating engine-powered transport category airplanes similar to those prescribed in § 121.177(a)(1) for air carriers and commercial operators. Section 91.37 now provides that no person may take off any transport category airplane (other than a turbine engine powered airplane certificated after September 30, 1958), unless (1) the takeoff weight does not exceed the authorized maximum takeoff weight for the elevation of the airport of takeoff; and (2) the elevation of the airport of takeoff is within the altitude range for which maximum takeoff weights have been determined.

We believe the requirements of § 91.37 together with those in § 91.5 provide an adequate level of safety for takeoff of a transport category airplane (other than a turbojet-powered multiengine airplane certificated after September 30, 1958) without the need of the accelerate-stop distance limitations proposed in § 91.205. In place of those limitations, § 91.205 as adopted herein merely contains a cross reference to the weight limitations for transport category airplanes prescribed in § 91.37.

13. *VFR fuel requirements.* Most of the comments received in response to the VFR fuel requirements proposed in § 91.207 recommended a fuel reserve of 30 minutes at 1,500 feet above ground level (AGL). Although a reserve of 30 minutes for VFR operations is adequate, the computation of that fuel at 1,500 feet AGL may place an undue burden upon the operators. Accordingly, § 91.207 as adopted herein requires a fuel reserve of at least 30 minutes for VFR operations.

14. *Operating in icing conditions.* Most of thecommentators recommended that § 91.209 should be changed to permit the pilot of an airplane to have final authority to make the flight if he believes after an evaluation of the available data and other pertinent factors that the flight can be conducted safely.

Under the provisions of that section, as proposed, the pilot may ignore a forecast of icing conditions if the current weather reports and other briefing information indicate

that the icing conditions reported in the forecast will not be encountered en route. We believe that further authority for the pilot to ignore reports of icing conditions that may be encountered en route may establish a questionable operating practice.

Some of the commentators felt that the proposal in § 91.209(b)(1) restricting flights into a known or forecast "light" icing condition was unnecessary. We agree and have removed that restriction from the rule as adopted herein.

15. *Flight engineer requirements.* Most of the commentators did not express a recommendation for or against the flight engineer requirement in proposed § 91.211. Some commentators, however, were of the opinion that the rule was unnecessary since the need for a flight engineer on an airplane is determined during its type certification based upon cockpit configuration, pilot workload ,and other pertinent factors.

Part 121 requires a flight engineer on certain airplanes certificated before January 2, 1964, with a maximum certificated takeoff weight of more than 80,000 pounds, even though a flight engineer is not required as a part of the type certification of those airplanes. This decision was reached after extensive study and evaluation and is still applicable to those airplanes when operated under Part 121. We are not persuaded that a flight engineer is not needed on those airplanes simply because they are not operated under Part 121. Accordingly, the provisions of § 91.211 are adopted without change.

16. *Second in command requirements.* The majority of the comments favored the second in command requirements proposed in § 91.213. In view of the change in the applicability of Subpart D, the rule as adopted herein only applies to large airplanes and turbojet-powered multiengine airplanes. In the preamble to the proposed rule we noted that NPRM 71–8A (36 F.R. 11865) would amend Part 61 to include recent experience and other qualifications for the second in command of an airplane type certificated for more than one pilot. We have determined that the second in command, when required by § 91.213, should meet the qualification standards proposed in that NPRM without further delay. Accordingly, § 61.47b as proposed in that Notice is redesignated as § 61.46, and adopted herein as an amendment to Part 61. To bring this requirement to the attention of the operators concerned, a new paragraph (b) has been added to § 91.213 requiring a person acting as second in command of any large airplane or turbojet-powered multiengine airplane, type certificated for more than one pilot, to meet the qualifications prescribed in § 61.46 as adopted herein.

The portions of NPRM 71–8A pertaining to the pilot in command proficiency requirements and those requirements pertaining to the second in command of airplanes not subject to Subpart D, require further study and evaluation and no final action will be taken on that portion until the study is completed.

To accommodate those airplanes having only one pilot station, such as former military airplanes certificated for special operations, § 91.213 as adopted permits an airplane having only one pilot station to be operated under an authorization from the Administrator.

Finally, to make it clear that the qualification requirements of the new § 61.46 do not apply to a second in command receiving required flight training, § 61.46 excepts those flights when passengers or cargo are not carried.

17. *Flight attendant requirements.* The majority of the comments received in response to the Notice made no recommendation for or against the flight attendant provisions in § 91.215. A proposed, that section required each flight attendant to be "familiar" with the functions to be performed and to be "capable" of using the emergency equipment installed on the airplane for the performance of those functions. To insure that each flight attendant meets those requirements § 91.215, as adopted herein, requires the flight attendant to demonstrate to the pilot in command that he or she meets the requirements for a flight attendant as prescribed in that section.

18. *Inspection Program.* As proposed, the inspection program requirements of § 91.217 applied to large airplanes and turbine-powered multiengine airplanes (turbojet and turboprop). In addition, they were also applicable to small turbine-powered multiengine airplanes operated by the holder of an ATCO certificate under Part 135. For the reasons previously stated, there is no change in the applicability of the inspection program requirements.

Most of the comments received generally concurred with the inspection provisions contained in the proposed § 91.217. Supported by individual comments from its members, the NBAA recommended that the rule should provide for the use of a commercially available inspection program based upon the use of a computer. Recognizing that large or turbine-powered multiengine airplanes are complex and for the most part systems oriented, these operators are to a great extent dependent upon the manufacturer's recommendations for a proper inspection program. To facilitate the implementation of these programs, some aircraft manufacturers have developed satisfactory continuous inspection programs utilizing computers that may also be utilized by the aircraft operator in nonaviation areas of his business. The FAA has no objection to such an inspection program and wishes to make it clearly understood that the inspection program can be used under the authority of § 91.217(b)(5) if it is approved by the local FAA District Office.

The NBAA and its members requested deletion of the provision in the proposed § 91.217(a) that requires replacement of life-limited parts specified in the "manufacturers' information" for the airplane concerned. The commentators were of the opinion that the manufacturers' information in regard to replacement of life-limited parts should be considered as a recommendation, but should not be mandatory. The life-limited parts referred to in the proposed rule were intended to be those required by the Administrator. Usually life limits are established during the type certification of a product and either listed in the FAA type certification data sheet, or product specification that is a part of the type certificate. Sometimes, for the convenience of the operator, the manufacturers' maintenance instructions also list life-limited parts that are made mandatory in the FAA type certification data sheet or product specification. To eliminate any misunderstanding in regard to the replacement of life-limited parts, the language of § 91.217(a) has been changed to require compliance with the replacement times for life-limited parts specified in the aircraft data sheets, or other document approved by the Administrator. The listing of such parts in the manufacturers' maintenance instructions would then be mandatory only if it is so specified in the aircraft data sheets or otherwise approved by the Administrator.

Many of the commentators were of the opinion that after the initial FAA approval of an operator's inspection program further FAA approval is unnecessary if a change is made in that program which is clearly an accepted inspection and maintenance practice. Although any change in the inspection program requires FAA approval to retain its status as an approved program, additional approval or minor changes are unnecessary if enough flexibility is established in the initial inspection program to accommodate those changes. By obtaining approval for such an inspection program an operator may modify his program within the parameters established in that program without the need of obtaining an additional FAA approval. On the other hand, by the initial approval of such a program the FAA is assured that the modified inspection program will remain sufficient to assure the airworthiness of the airplane.

Some commentators felt that an operator should not be limited to calendar time in the selection of his continuous inspection program. As proposed, § 91.217(e)(2) required a schedule for the performance of inspections expressed in terms of time in service, calendar time, number of systems operations, or any combination of these. We believe the section as proposed clearly allows the operator to choose an inspection schedule controlled by factors other than calendar time and, therefore, no change has been made to that section as adopted herein.

Notwithstanding the choice of inspection programs given to the operator under the proposed § 91.217, some commentators were of the opinion that the FAA should prescribe a uniform inspection program for all operators. Experience indicates that such a program would be impracticable under the broad spectrum of environment in which large or turbine-powered multiengine airplanes are operated today. The cycles of operation, stage lengths, number of landings per period, and even the climatic conditions may be different for each operator. To impose a single inspection program upon all operators, we believe, would place an undue burden upon many operators without enhancing the airworthiness of their airplanes.

The Air Transport Association states that it is unnecessary for an air carrier to notify the FAA of the type of inspection selected for an airplane each time it is used for a training or ferry flight. It is to be noted that air carrier airplanes are required to be inspected in accordance with a continuous airworthiness inspection program approved under Part 121. Therefore, it is not necessary for an air carrier to submit another notice of the inspection program under § 91.127 each time the airplane is used for training or ferry flights unless a different inspection program is used.

The National Transportation Safety Board concurred with the proposed inspection rule, but suggested that the rule should include a "return to service inspection" after a specified period of nonservice. The FAA agrees that when an airplane has been out of service for an extended period of time, an inspection should be performed before it is returned to service. The time and depth of the inspection, however, are dependent upon many variables such as climate, storage area, and type of airplane. An advisory circular will be issued as soon as possible containing information and recommendations for the accomplishment of such inspections under this program or other programs permitted under the regulations. We do not believe it is desirable at this time to make such inspections mandatory until further study is made.

To make it clear that the inspection requirements specified in § 91.217 apply to the emergency equipment including the survival equipment specified in § 91.189, the words "survival equipment" have been added to the items for which an inspection is required in accordance with the inspection program selected by the operator.

The applicability provisions of § 91.181(a) have been amended to also make it clear that the inspection requirements of §91.217 apply to small turbine-powered multiengine airplanes operated under Part 135 and to U.S. registered airplanes even though they are operated by a foreign air carrier under Part 129.

The preamble to NPRM 71–32 stated that for the convenience of the operators of airplanes subject to the rules in Subpart D, other provisions of Part 91 pertaining solely to airplanes subject to Subpart D would be incorporated by reference within the framework of that subpart. Upon further review of the provisions of Part 91, such an incorporation by reference is unnecessary.

In consideration of the foregoing, a new Subpart D to Part 91 and conforming amendments to Parts 43, 61, 91, and 135 of the Federal Aviation Regulations are hereby adopted, to read as set forth herein, effective October 23, 1972.

This rule is adopted under the authority of sections 313(a), 601, 602, 603, 604, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1422, 1423, 1424, and 1425), and section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Amendment 43–16

Aircraft Maintenance and Related Records

Adopted: August 1, 1972 **Effective: September 8, 1972**

(Published in 37 F.R. 15981, August 9, 1972)

The purpose of these amendments to Parts 43, 91, 121, and 127 of the Federal Aviation Regulations is to revise the maintenance and related recordkeeping requirements for aircraft and aircraft components.

These amendments are based on a Notice of Proposed Rule Making (Notice 70–43) published in the Federal Register on October 29, 1970 (35 F.R. 16740). A number of comments were received in response to the Notice and, except for those indicating agreement with the proposal or merely repeating issues discussed and disposed of in the Notice, the FAA's disposition of the comments is set forth hereinafter.

Several commentators were concerned that proposed § 91.173 would require more recordkeeping than is now required by the present rule thereby increasing the burden on owners and operators. However, the comments did not cite specific examples to support their concern in this respect. In this connection, both the present and the proposed rules require a complete record of maintenance and alteration of each aircraft and engine. The proposal is clarifying, however, in specifically requiring that records of maintenance and alteration be kept also for propellers, rotors, and appliances. Moreover, whereas the present rule requires total time in service records for aircraft and certain engines, the proposal requires such records only for the airframe and as necessary for showing the current status of life-limited parts, applicable airworthiness directives, and aircraft inspections. A primary objective of the amendments is to produce more useful records and while it is not possible to say in any given case that recordkeeping will not be increased, it is possible that in some instances, there may be a reduction.

In further connection with the recordkeeping under proposed § 91.173, one commentator was concerned that the proposal did not give assurance that work already performed would not be subject to record verification back to the time of construction of the basic airplane or component. However, the commentator's suggestion, that a date be established after which the data specified in the proposal would be required, would permit all records of work performed prior to that date to be destroyed. The purpose of the proposal was to ease the record retention requirement of the present regulations which make no provision for the disposal of superseded or obsolete records that are now part of the "permanent" records and accordingly required to be retained for the life of the article. Proposed § 91.173 effectively makes provision for retaining specific records only for the period of time they are useful, after which they may be discarded. This applies to existing as well as future records. To the extent that the commentator is concerned that the data required to be retained under the present regulations may be set forth in a number of documents and that those documents may also contain data that can be disposed of under the proposal, it should be noted that the owner or operator has the option of retaining those documents or establishing a new record containing only the required data.

Pointing out that proposed § 91.173 does not make specific provision for logging repairs or alterations by reference to FAA Form ACA–337, one commentator asked if that procedure were being deleted. The proposal makes the language of § 91.173(a)(1)(i) consistent with that of § 43.9(a)(1). Accordingly, where maintenance or alteration is recorded by reference to Form ACA–337 in compliance with § 43.9(a)(1), the owner or operator receives from the person who maintains or alters the aircraft an entry to that effect in the aircraft maintenance record. That entry meets the requirement of § 91.173(a)(1)(i) since it references data acceptable to the Administrator and any further description of the work would be superfluous. For this reason, it is unnecessary to include a provision that repairs or alterations may be logged by making

specific reference to Form ACA–337 even though, as indicated above, such a recording procedure may continue to be utilized in an appropriate situation.

Three commentators requested clarification of the intent or meaning of the phrase "current status of life-limited parts" used in proposed §§ 91.173(a)(2)(ii) and 91.174 (b)(4). Two other commentators questioned whether "life-limited" referred to manufacturers' recommendations or to limitations included in the aircraft type certificates issued by the FAA. The intent of the proposal is to assure that records are kept from which the "current status" of life-limited parts can be determined. The term "life-limited parts" refers to parts or components for which retirement times, service life limitations, parts retirement limitations, retirement life limitations, or life limitations exist. By whatever term they are called, such limitations on life-limited parts are those that are "required" by the Administrator under the provisions of the Federal Aviation Regulations. "Required" life-limits may be established during the type certification of a product and set forth in the type certificate data sheet (or product specification that is a part of the type certificate). They may also be established in an airworthiness directive, in an operator's operations specifications, in an FAA-approved maintenance program, including an inspection program, or in the limitations section of an Airplane Flight Manual or other manual required by an operating rule. Similarly, the phrase "required to be overhauled on a specified time basis", as used in proposed §§ 91.173(a)(2)(iii) and 91.174(b)(5), means "required" by the Administrator under the provisions of the Federal Aviation Regulations and refers to those items which must be overhauled on a specified or "hard" time inservice basis established by one of the same procedures mentioned above in connection with life-limited parts.

Indicating its belief that proposed § 91.173 does not go far enough in setting forth recording requirements, one commentator suggested that the amendment should also require a record of maintenance that had been scheduled but not performed as, for example, work written up by technicians and inspectors or included in a service bulletin but not accomplished prior to return to service because it had been deferred or deemed to be a "noncompliance" item. The situation presented by this commentator relates to air carrier operations and is, therefore, not properly cognizable under § 91.173. However, to the extent that it applies to maintenance in general, the FAA does not agree with this concept of recordkeeping. The FAA believes that a proper maintenance record is a record of the work actually done and of the identification of the persons approving the work. Moreover, contrary to a further recommendation, the FAA does not believe there is any necessity that work performed be recorded both by description and by reference to data acceptable to the Administrator since a proper description of the work may be given without reference to bulletins, manuals, or engineering data.

With reference to the disposition of records, one commentator suggested that at the time of the annual inspection, the required data on time-in-service alterations, and airworthiness directives be submitted to the FAA for retention. Another commentator in a similar vein wanted records of all work, including nondestructive test records, kept for one year, whether or not the work was repeated or superseded, and then microfilmed and submitted to the FAA. The FAA disagrees with these comments. Obsolete and redundant records do not aid in determining the current condition of an aircraft, and the FAA does not have facilities to be the repository of such records. Current records, as provided in the amendment to § 91.173, are to be retained by the owner or operator.

One commentator recommended that maintenance records should be required for any time period that an aircraft may have been a public aircraft. However, under the Federal Aviation Act of 1958 public aircraft are not subject to the certification and maintenance requirements of the Federal Aviation Regulations. Therefore, a prospective purchaser of a public aircraft must assess the records of such an aircraft against the recordkeeping requirements of § 91.173 to assure their adequacy for civil aircraft purposes. Finally, it should be noted in connection with proposed § 91.173, that clarification of the term "approved", as requested by another commentator, is unnecessary in view of the definition of that term in Part 1 of the Federal Aviation Regulations. However, § 91.173(a)(1) has been revised to make it clear that it includes records of other required inspections as well as of other approved inspections. In addition, for further clarification and consistency, § 91.173(a)(2) has been revised to list, as records required to be kept, all the information listed for transfer in § 91.174(b) of the proposal.

With regard to proposed § 91.174(b)(1), one commentator reported seeing logbook entries that recorded compliance with airworthiness directives without including a description of compliance, and recommended that a "grandfather" provision be provided or the regulation be made more specific as to recording the method of compliance. Contrary to the commentator's understanding, proposed § 91.174(b)(1) merely continues the present requirement that the method of compliance must be recorded. It should be noted that airworthiness directives generally refer to a manufacturer's service bulletin for one acceptable method of compliance, and if the service bulletin is followed, the record of the method of compliance may be made by referencing the service bulletin.

The present regulations require that the entire maintenance record be given to the transferee upon disposition of an aircraft. Notice 70–43, on the other hand, proposed that the mandatory transfer of maintenance records include only summary information in the form of various status and time lists. One commentator requested clarification of the proposed record transfer requirement since it appeared that the transfer of the other maintenance records should be the subject of agreement between seller and purchaser. In this connection, the proposal continued the requirement that all maintenance records required to be kept be made available for inspection by the FAA and the National Transportation Safety Board (NTSB). Therefore, to insure the availability of necessary records, notwithstanding an intervening sale, the transfer requirements of new §§ 91.174, 121.380a and 127.142, make provision for all maintenance records required to be kept. Following the suggestion of the commentator, maintenance records, other than the status and time summaries, may either be transferred to the purchaser or, upon agreement of seller and purchaser, remain in the physical custody of the seller. In the latter event, however, the purchaser as the new owner, or operator, is not relieved of his responsibility to make the records available for inspection by the FAA and the NTSB.

One commentator objected to continuation of the requirement stated in proposed § 121.380(b) for retention of the record of the last complete overhaul of certain items. The commentator contends that for many such items used by air carriers, complete overhaul has been effectively superseded by the application of various maintenance control programs such as condition-monitoring and fault-isolation techniques. The FAA does not agree, however, that all provisions for overhaul record retention should be deleted. The proposal takes into account the realistic needs of the air carriers and investigative agencies in relation to the present state-of-the-art of data collection, recording, and storage. Notwithstanding the availability of various maintenance control program techniques, overhaul remains a part of maintenance even though the number of items overhauled may vary from operator to operator. Where a maintenance program for an item of aircraft equipment does not require overhaul, of course, there will be no overhaul records requiring retention under this provision. The FAA does agree that there should be a provision for the disposal of overhaul records when the work is superseded by other work. The intent of the Notice was that overhaul records not be subject to the one year rule but that they be retained until the work is superseded by work of equivalent scope and detail, and the proposal has been changed accordingly.

With reference to a query regarding the airworthiness release form, it should be noted that the form itself is not a maintenance record covered by the retention requirements of § 121.380, notwithstanding certain requirements for records relative to it as stated in that section. Retention of the airworthiness release form continues to be governed by § 121.709.

Another comment questioned the different retention times for certain records by air carriers and by repair stations and manufacturers doing work for the carriers and further alleged that the proposal requires a duplication of certain records. However, the FAA does not believe there is any inconsistency. The recording and retention requirements for the carriers on the one hand and repair stations and manufacturers on the other are necessarily governed by the needs of each and are not duplicative. A person performing maintenance for an air carrier must perform and record that work in accordance with the carrier's manual but the manual need not be identical with recording requirements for repair stations or manufacturers.

Anticipating a situation in which records required to be transferred with an aircraft might not be available, one commentator recommended the retention of the provisions of present § 121.699(c) under which an aircraft component, aircraft engine, propeller, or appliance could be placed in service without complete records if certain conditions are met. However, since the comment was specifically directed at the airframe, the provisions of the section that is being deleted would be inapplicable in any event under the conditions stated in present § 121.699(c). Moreover, as the commentator recognized, it would be rare not to have the aircraft history and total time records available, and such cases should be dealt with on an individual basis.

Proposed § 91.173 deletes the present reference to "permanent" maintenance records. Similarly, proposed §§ 121.380 and 127.141 delete the provisions contained in the present sections which, in part, require a record of "all" maintenance. For internal consistency, the related provisions of Part 43—Maintenance, Preventive Maintenance, Rebuilding, and Alteration, should also be changed. Accordingly, this amendment includes editorial changes to §§ 43.9 and 43.11 which delete the word "permanent" in connection with maintenance record entries, and the word "all" with reference to the recording of air carrier or commercial operator maintenance, rebuilding, and alteration.

Finally, the proposal has been editorially revised and minor clarifying changes have been made in the wording of the regulations proposed in Notice 70–43. However, these changes are nonsubstantive in nature. In this connection, § 91.161(b) is being amended to exempt aircraft maintained in accordance with a continuous airworthiness maintenance program as provided in Part 121, or 127, or 135 from the requirements of § 91.174 and the same requirements are being made applicable to those certificate holders in new §§ 121.380a and 127.142. This revision is consistent with the current exemption for these aircraft from the requirements of § 91.173.

Interested persons have been afforded an opportunity to participate in the making of these amendments, and due consideration has been given to all matter presented.

In consideration of the foregoing, Parts 43, 91, 121, and 127 of the Federal Aviation Regulations are amended as follows, effective September 8, 1972.

These amendments are made under the authority of sections 313(a), 601, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, and 1425), and of section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Amendment 43–17

Airborne ATC Transponder Equipment

Adopted: December 18, 1972 Effective: January 26,1973

(Published in 37 F.R. 28495, December 27, 1972)

The purpose of these amendments to Parts 37, 43, 91, 121, 127, and 135 of the Federal Aviation Regulations is to provide new standards for Airborne ATC Transponder Equipment and to require that transponders in aircraft meet TSO standards.

These amendments are based on a Notice of Proposed Rule Making (Notice 71–10) issued on March 22, 1971, and published in the Federal Register on March 30, 1971 (36 F.R. 5853). Numerous comments were received in response to Notice 71–10 and the relevant comments are discussed below. Based upon these comments and upon further consideration by the FAA, a number of changes have been made to the proposed rule.

Interested persons have been afforded an opportunity to participate in the making of these amendments, and due consideration has been given to all relevant matter presented. Except as modified by the following discussion, the reasons for these amendments are those set forth in the Notice.

A number of comments objected to the use of the TSO system for the approval of Class 2A and 2B ATC transponders. The commentators assert that the TSO system is primarily intended to provide approvals for equipment for air carrier operations, that it is too time-consuming and costly for equipment intended to be used on general aviation aircraft, and that alternative approval methods should be allowed. It should be noted that under § 21.305 of the Federal Aviation Regulations an appliance may be approved under the TSO system, or as part of the aircraft design under the aircraft type certification procedures, or in any other manner approved by the Administrator. The same methods of approval are permitted under the proposal and this amendment. The FAA does not believe that the methods suggested by the commentators would provide the production quality control and FAA surveillance that is necessary to assure that the transponders meet the proposed standards which are required for FAA approval.

In response to a number of comments that the proposed TSO data requirements in subparagraph (d)(1)(iv) of § 37.180 can be interpreted as requiring a full compliance test program on each production unit, the subparagraph has been revised to make it clear that the equipment data sheet must specify the actual performance of equipment of a type rather than of each individual unit. In addition, subparagraph (d)(2) has been revised to include, by reference, the manufacturer's operating instructions and equipment limitations in the information that must be furnished with each article.

A number of comments objected to the implementation dates specified in the notice. All but one of those commentators maintained that the proposed effective dates would not provide a reasonable service life for the equipment already in service or in production, and they recommended a postponement in the implementation dates for periods varying from a few years to an indefinite period of time. The other commentator recommended that the implementation date for newly installed equipment in air carrier aircraft be the same as the implementation date for the rules that will result from Notice of Proposed Rule Making No. 69–9. Based on this comment and upon further consideration the implementation dates have been changed to January 1, 1974, for new equipment installations and July 1, 1975, for all equipment installations in order to make them consistent with the dates proposed in Notice 69–9, as supplemented by Notice 72–12.

In response to the request in Notice 71–10 for comments as to the need for the proposed low altitude transponder category, numerous comments were received recommending its retention. Several of the commentators also suggested that the utilization altitude be tied to an operational air traffic control altitude presently in use, such as the 18,000 foot altitude used to define positive control areas. In support of the retention of a low altitude transponder category, the commentators estimated variously that high altitude transponders are from 5% to 82% more costly than low altitude transponders, and that it would be unreasonable to require a high altitude transponder on aircraft which would

only operate above the altitude under extreme weather or emergency conditions. Based on these comments, the amendment retains the provisions for a low altitude transponder category. The FAA does not agree with the suggestion that the altitude limit for use of low altitude transponders be tied to defined positive control areas because of equipment considerations.

One commentator recommended the elimination of the high altitude transponder category on the ground that there is no technical justification for requiring a higher power output for transponders in aircraft operating at altitudes above 15,000 feet. The FAA does not agree. A power output, greater than that required in the low altitude transponder, provides assurance that aircraft that operate at high altitude, and at great horizontal distance from the receiving station will show up on the air traffic controller's scope.

A comment was received suggesting that air traffic controllers should be instructed as to the difference in capabilities of low and high altitude transponders, and that pilots should be required to inform air traffic controllers as to the type of transponder installed on his aircraft. However, since the proposed operating rules require the use of a transponder appropriate to the type of operations intended, the FAA does not believe that there is a need to require pilots to inform air traffic controllers as suggested.

The FAA does not agree with a suggestion made by several commentators that the environmental test requirements be revised to include Option C of Part One in Section III of RTCA Document DO–144. The RTCA option suggests that the manufacturer, as a minimum, should state the range of temperature and altitude over which his equipment is capable of operating. Proposed § 37.180(a)(2) (renumbered as subparagraph (a)(3) in this amendment) specifies these conditions and, in addition, humidity, shock, vibration, and power input voltage. Due to the wide range of environments in which general aviation aircraft operate, the minimum environmental conditions specified in Option C of Part One of Section III of RTCA Document DO–144 are insufficient to insure the required level of reliability.

One commentator requested that operators certificated under Part 135 be permitted to use any class of complying ATC transponders since certain operating limitations placed on Part 135 operators are not applicable to air carriers. The FAA does not agree. The limitations mentioned by the commentator are not related to the capability of the type of transponder used, and the reasons which justify the proposed requirement for air carriers are equally applicable to Part 135 operators.

In response to a suggestion that provisions be made for the continued operation of transponders approved under TSO–C74 and TSO–C74a, the proposed operating rules have been revised to permit the approval of operations with such transponders after July 1, 1975, if the applicable performance standards of TSO–C74c and the environmental standards of the TSO under which the equipment was manufactured are shown to be met.

One comment stated that the design tolerance specified in subparagraph II A.5.a. of Part Two in RTCA Document DO–144 are much stricter than would be required in actual usage. The commentator recommended that transponders should not reply to more than 10 percent of the interrogations when the interval between pulses P_1 and P_2 differs from that defined in Appendix A for the mode selected in the transponder by more than ±15 percent of the nominal specification. The FAA does not agree that the tolerances are much stricter than that required in actual usage. Furthermore, the requirement specified in the proposed TSO is consistent with that required by ICAO for international operations.

One comment recommended that subparagraph II A.5.b. of Part Two in RTCA Document DO–144 not be included in the TSO on the ground that its requirements are duplicated in subparagraph II A.9.b. of that document. To the contrary, however, subparagraph II A.5.b. applies only to the reply capability of the transponder in response to single pulses, while subparagraph II A.9.b. applies to both reply and suppression action to pulses wider than 1.5 microseconds.

The FAA also disagrees with a recommendation that the dead time specified in paragraph II A.6. of Part Two of RTCA Document DO–144 be increased from 125 microseconds to 500 microseconds, thereby reducing transponder live time. The rapid increase in the use of Mode C ground equipment by civil and military facilities requires a high

degree of system reliability to assure that adequate replies are obtained on each interrogation during critical periods. In areas where multiple interrogators operate, high transponder live time is essential for altitude data.

One comment suggested that the test of suppression specified in paragraph II A.7. of Part Two in RTCA Document DO–144 be performed with the received amplitude P_2 greater than the received amplitude of P_1 by 2db, or more, and that the suppression re-initiation period be increased from 2 to 50 microseconds. The FAA does not agree. Due to the effects of lobing caused by reflection from the surface of the earth, the signal levels of P_1 and P_2, which are radiated from different ground antennas at slightly different heights above ground, frequently arrive at the aircraft at equal levels. For suppression of side lobe signals, it is essential that transponders provide suppression action at equal signal levels. In addition, to avoid unacceptable interference with the operations of military facilities, the retention of the 2 microsecond suppression re-initiation period is essential.

In response to a comment that subparagraph II A.8.c. of Part Two in RTCA Document DO–144 could be misinterpreted, a new § 37.180(a)(2)(i), entitled "Exceptions" has been added to the proposed TSO which replaces that subparagraph with a requirement over which the reply characteristics apply.

In reply to another comment recommending the elimination of the requirement of paragraph II A.9. of Part Two in RTCA Document DO–144, an exception has been added as new § 37.180(a)(2)(ii) to relieve the manufacturer from complying with subparagraph II A.9.a. Field testing has shown that transponder squitter due to noise is not a significant problem. The requirement for narrow pulse rejection is not needed if the random triggering and suppression rate requirements of paragraph II A.11. of Part Two in RTCA Document DO–144 are met. On the other hand, service experience and testing indicate that the wide pulse type interference associated with the requirements of subparagraph II A.9.b. does present a problem so that compliance is required.

A comment recommended elimination of the echo suppression and recovery requirement contained in paragraph II A.10. of Part Two in RTCA Document DO–144 on the basis that the problem is caused by inadequate ground equipment. The FAA does not agree. Echoes (multipath signals) caused by signal reflections from terrain and buildings, cause practical problems in transponder operation. Extensive experience in the operation of the Air Traffic Control Radar Beacon System (ATCRBS) has developed a standard desensitization and recovery curve to minimize the multipath effects on the operation of transponders. Moreover, the FAA locates its own traffic control radar receiving stations so as to minimize the number of echoes. However, since it is practically impossible to eliminate all echoes through the geographical location of the ground station, the proposed requirement providing for capability of the airborne equipment to reject that type of signal has been retained.

One commentator objected to the requirement contained in paragraph II A.13. of Part Two in RTCA Document DO–144 on the ground that, in the FAA's planned airborne environment, an interrogation rate of 1,000 per second will seldom be exceeded. It was contended that if the purpose of the requirement is to protect the airborne transmitter from damage due to excessive replies, more straightforward means are available than are contained in paragraph II A.13. The FAA does not agree. The Air Traffic Control Radar Beacon System operates on a common frequency with the military IFF system, and in many areas of the country, the operation of civil and military facilities results in peak interrogation rates exceeding 1,000 per second. Reply rates must be limited in order to provide adequate service to the closer (stronger) interrogators since excessively high rates would result in unacceptable interference to all users.

One commentator, referring to subparagraph II A.16.b.(1) of Part Two in RTCA Document DO–144, asked whether there was any requirement that the transponder's mode switch have any function other than Off, Standby, On, and Altitude Off (i.e., stop transmitting altitude information pulses while still transmitting the Mode C framing pulses and normal Mode A replies). Subparagraph II A.16.b.(1) requires the transponder to respond to Mode C interrogations independently of other modes or codes manually selected. It does not require other modes or codes to be available or selectable.

The FAA does not agree with a comment objecting to the receiver bandwidth limitation contained in paragraph II A.18. of Part Two in RTCA Document DO-144. The commentator contended that those requirements are for the purpose of limiting squitter and suppressions, which is adequately covered by paragraph II A.11. of RTCA Document DO-144. While that assertion may be true for interference originating within the aircraft, paragraph II A.11. does not provide protection from external sources of interference. The only practical means of protecting transponders from interference originating external to the aircraft is by a reasonable limitation on the receiver bandwidth.

One commentator stated that if the TSO is being amended to permit the operation of the Genave PWI system, proposed paragraph 2.7.c.(2) of the "Federal Aviation Standard, Airborne ATC Transponder Equipment" should be changed because the present wording rules out that system. The FAA does not agree. The proposed change was not limited to the Genave PWI system and was worded broadly enough to include all types of external attachments. The maximum allowable dead time of 4.5% should not be reached by the Genave PWI since it does not generate suppression pulses during the alarm mode. ATCRBS side lobe interrogations are considered valid interrogation signals and are not included as part of the 4.5%.

A comment also questioned whether paragraph 2.7.c.(2) of the "Federal Aviation Standard, Airborne ATC Transponder Equipment" applies to internal suppression or if that paragraph requires the use of an external suppression jack on a class 2A transponder. The dead time created by means other than normal interrogations, as stated in paragraph 2.7.c.(2), refers only to external devices such as TACAN, DME, or PWI. The paragraph does not require a manufacturer to provide an external suppression jack. In reply to another question, the proposal does not create any additional environmental categories.

One commentator opposed the 2,500 microsecond and 4.5% duty cycle dead time requirements of proposed paragraph 2.7.c.(2) of the Federal Aviation Standard because the increase in dead time would permit a loss of transponder replies and would impair the accuracy of symbology used in new automated air traffic control systems. The commentator recommended limiting dead time from external sources to no more than 85 microseconds per suppression period at a random repetition rate such that dead time occupies no more than 2.6% of the time. The FAA does not agree. A maximum of 2,500 microseconds dead time per suppression limited to a 4.5% duty cycle will not inhibit more than one reply per beamwidth at a terminal radar (ARTS) installation. The terminal ATCRBS facilities operate at a nominal 18 hits per beamwidth, and an occasional missing reply out of the 18 replies is not believed serious enough to hinder the accuracy of symbology used in new automated ATC systems.

Another comment contended that the requirement of paragraph 2.7.(c) of the Federal Aviation Standard and paragraph II A. of Part Two in RTCA Document DO-144 could be construed to require duty cycle limitations on inputs capable of generating transponder dead time and that an unnecessary burden could result. While the commentator has correctly stated the requirement, the FAA does not agree that the requirement creates an unnecessary burden. The dead time requirement need only be met taking into consideration the foreseeable inputs to the transponder.

One comment, while supporting the use of the TSO system for the approval of transponders, objected to the incorporation of RTCA Document DO-144 into the TSO. The commentator asserted that DO-144 was intended to fulfill a need for approval of the installed system and that its incorporation would result in a TSO that applies an "approval-per-installation philosophy" placing a burden on the manufacturer which would result in a more costly transponder. Apparently the commentator construed the proposed TSO requirement as referring to both Section II and Section III of Part Two in RTCA Document DO-144. The minimum performance standards specified in the TSO requirement are contained only in Section II. Section III merely describes one acceptable method (but not the only method) of determining compliance with those minimum performance standards. Other methods (not necessarily involving installation of the transponder in an aircraft) may be used.

In connection with Section III of Part Two in RTCA Document DO-144, one comment stated that the test condition specified in subparagraph III B.1.d.(4) is unnecessarily severe. The FAA agrees. However, as noted above, Section III merely describes

one acceptable method of determining compliance with the minimum performance standards. If a manufacturer does not choose to use the test condition in subparagraph III B.1.d.(4), he may use any other acceptable test condition, such as repeating the test condition of subparagraph III B.1.d.(2) but with P_3 at the nominal interval following P_4, and combining the interrogation signal set to an interrogation rate of 100 interrogations per second with a non-synchronous single pulse generator operating at 1,000 prf and at an r_f level 10db below that of P_1 and P_3.

Another comment questioned the note following Section III B.1.j.(2) of Part Two in RTCA Document DO-144. An acceptable alternative to that note would be to exclude the intervals between pulses corresponding to a normal Mode 3/A, Mode C, and a side lobe interrogation.

In addition, with reference to RTCA Document DO-144, it should be noted that subparagraphs II A.16.b.(2), (3), (4), (5), and (6) of Part Two of that Document contain standards for ATC transponder equipment systems that incorporate complete altitude reporting capability, including: (1) an analog-to-digital converter, (2) a pressure altitude data source, (3) a capability of reporting pressure altitude, and (4) a correspondence of the reported altitude with the altitude indicated by the aircraft flight altimeter. It was not the intent of the FAA in this rule making action to require ATC transponders to have complete altitude reporting capability. Therefore, the proposal has been revised by adding new §§ 37.180(a)(2)(iii) and (iv) which delete the requirement for compliance with those standards unless the manufacturer elects to provide complete altitude reporting capability. However, the requirement that all transponders reply to Mode C interrogations with framing pulses F_1 and F_2 is retained in order to facilitate the incorporation of complete altitude reporting capability by the transponder users if that capability is required or if the user should desire that feature. The areas of operation in which complete altitude reporting capability will be required, is the subject of the rule making action proposed in Notice 72-12 (37 F.R. 7527).

Following further review of proposed §§ 91.24, 121.345, 127.123, and 135.143, the proposals have been revised to more clearly indicate that ATC transponders may be approved under the TSO system or in conjunction with type certification procedures, or in any manner approved by the Administrator, but in any event they must meet the performance and environment requirements of the applicable TSO standards.

Finally, transponder field tests conducted subsequent to the issuance of Notice 71-10 indicate that a large number of the transponder deficiencies occurring in service could be prevented if the transponder were inspected and adequately maintained. Accordingly, a new § 91.177 is being adopted which requires that after January 1, 1974, ATC transponder equipment installed and used as provided in this amendment must be tested and inspected and found to comply with the maintenance requirements which are being adopted as new Appendix F to Part 43. New § 91.177 applies only to ATC transponders that, under the provisions of § 91.24, § 121.345(c), § 127.123(b), or § 135.143(c), are required to meet the standards specified therein. While this requirement was not proposed in Notice 71-10, the FAA has determined that safety requires that the ATC transponders be inspected annually to assure that they continue to meet the TSO standards. Further delays in implementing this course of action would not be in the public interest. Therefore, this final rule includes inspection and testing requirements for transponders. However, since a compliance date has been established subsequent to the effective date of the amendment, interested persons may submit comments on the new § 91.177 of Part 91 and the new Appendix F to Part 43. The FAA will consider all comments received on or before March 27, 1973, and may further amend the regulations in the light of these comments.

In consideration of the foregoing, Parts 37, 43, 91, 121, 127, and 135 of the Federal Aviation Regulations are amended as follows, effective January 26, 1973.

The amendments are made under the authority of sections 313(a), 601, 603, 604, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1423, 1424, and 1425), and of section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

NOTE.—The incorporation by reference in this document was approved by the Director of the Federal Register on April 16, 1969.

Amendment 43–18

ATC Transponder Tests and Inspections

Adopted: December 19, 1973 Effective: December 31, 1973

(Published in 38 F.R. 35441, December 28, 1973)

The purpose of these amendments is to modify the test and inspection requirements of § 91.177 and Appendix F of Part 43 of the Federal Aviation Regulations.

These amendments are based upon Amendments 43–17 and 91–107, published in the Federal Register on December 27, 1972 (37 F.R. 28495). The regulations concerning test and inspection requirements for transponders were adopted as additions to the amendments establishing standards for Airborne ATC Transponder Equipment arising from a Notice of Proposed Rule Making (Notice 71–10) issued on March 22, 1971, and published in the Federal Register on March 30, 1971 (36 F.R. 5853). Since the test and inspection regulations were adopted without prior notice, comments were solicited until March 27, 1973, to determine the need for further amendments to the regulations. Numerous comments have been received in response to this request and except for those indicating agreement with the present regulations, the disposition of the comments is discussed hereinafter.

Many of the commentators expressed the opinion that yearly tests and inspections are unnecessary because they believe that Air Traffic Control (ATC) is continuously providing inspection for their transponders during the normal interrogation and reply. They believed that the radar controller can determine and communicate to the pilot when a transonder needs calibration so that if no objection or comment is received from the controller the pilot can assume the transponder is functioning satisfactorily.

The FAA does not agree with the contention that the ATC can determine the calibration or proper functioning of a transponder. In the past, when air traffic control procedures were performed manually and during periods of low air traffic density, it was possible for air traffic controllers to assist in performing checks on transponder performance. Today, however, the automatic system utilizes computer equipment which either accepts or rejects transponder replies without any communication with the pilot. Thus, to ensure proper operation of transponders, it has become necessary to require independent checks of transponder signals.

Not only may the controller be unaware that a particular transponder is not performing within specification, since the signal may be rejected by the ARTS computer as being invalid, but, if the transponder operation has improper side lobe suppression it may generate extraneous replies which garble other transponder signals and prevent the computer from presenting to the controller valid data from properly operating transponders. Subtle degradation in transponder performance and certain other transponder malfunctions are not detectable by controllers under even the most favorable circumstances.

Many respondents also objected to the yearly tests as being counterproductive. They believed that the technical complexity of the tests would require removal and reinstallation of the transponder with the possibility that the transponder could be damaged. Several commentators also questioned the reliability of some repair stations. It was further pointed out by many commentators that the relationship between the current number of installed transponders (more than 60,000) to the number of repair stations presently able to perform transponder maintenance (523) would create a situation which would prevent an orderly schedule for the required inspections and tests. One commentator pointed out that, if the specific deviations shown in the 504 transponders tested by Lincoln Laboratory and reported in FAA Report No. FAA RD–72–30 are representative of the transponders presently in use, then over 60,000 deviations from specifications would be encountered in the first annual test. Several of the commentators suggested that, to avoid the anticipated overload on the repair facilities, the inspections and tests be conducted every two years instead of every year.

Based on these comments and on further review, the FAA has determined that the compliance date in § 91.177 should be extended from January 1, 1974, to January 1, 1976. This will provide lead time for new repair stations to obtain the necessary

certification to perform the tests. In response to further comments, the rule is also amended to expand the time interval for the periodic tests and inspections of transponders from every year to every two years in order to allow complete Mode C checkout during altimeter checks.

Many of the commentators, concerned that it would be necessary to remove the transponder from the aircraft to accomplish the tests, argued that the removal and reinstallation time and cost would be burdensome and that there would be a chance of damage to a previously operating transponder. They were also concerned with the impractically of measuring the transponder transmitter power output at the end of the transmission line. They believed this test would require additional costs because of the difficult accessibility of these lines in some installations.

The purpose of the tests and inspections is to ensure the use of properly operating transponders in the National Airspace System, and the FAA believes after further consideration that the use of portable ramp test sets would allow adequate testing of the installed transponder. Presently available portable test equipment would not allow testing of all the parameters presently specified in Appendix F of Part 43. However, after further consideration of the parameters presenty specified, the FAA has determined that adequate testing of the transponders can be accomplished in the aircraft without conducting the tests for reply transmission characteristics, framing pulse, reply codes, reply pulse width, and transmitter power output. These tests, set forth in paragraphs(b), (c), (d), and (g) of Appendix F to Part 43, have, therefore, been delated.

One commentator suggested that the interrogation rate for the suppression test be specified. The FAA agrees and has amended the suppression test to specify an interrogation rate of 235 per second with replies not to exceed 3 per second when P_2 equals P_1. This nominal pulse repetition rate of 235 will eliminate the interference caused by maintenance testing of transponders when the pulse repetition rate of the test signal is equal to or harmonically related to the pulse repetition rate of the ATC radar. In addition, the response has been changed to 211 replies per second when the amplitude of the P_2 pulse is 9db less than the P_1 pulse. The response rate is reduced from the previous rate of 450 per second to prevent harmful interference and reduce congestion on the ATC radar.

The requirement of -73 ± 4dbm for receiver sensitivity remains unchanged. However, an additional 3dbm tolerance is allowed to compensate for coupling errors associated with portable test equipment. In addition, consistent with the use of portable test equipment, an option is provided in testing for receiver sensitivity to allow measurements by radiated signal testing or by direct connecton at either end of the antenna transmission line.

The FAA does not agree with several commentators who contended that the tests would serve no useful purpose since a transponder could fail on the next flight or next day after an inspection. In the tests performed by the Lincoln Laboratory, 31 of the 549 transponders were inoperative and a significant number of the transponders failed to meet some of the parameters tested. More significantly, however, the operators appeared to be unaware that their transponders were not functioning properly. The FAA believes that this indicates that a significant number of transponder deficiencies are related to a lack of maintenance and a gradual degradation of transponder performance which might not be readily discerned in normal operation. The FAA therefore believes that periodic tests are necessary to assure adequate operation for use in the National Airspace System.

Several commentators believed that since their transponders were TSO'd future testing would be unnecessary. However, the TSO specifications and the operational specifications, although complementary, are not the same. As with any electronic device whether solid state or not, performance may deteriorate and may be subtle and not readily discernible. Therefore, the operational testing specified in § 91.177 is necessary for continued integrity of the system.

Interested persons have been afforded an opportunity to participate in the making of these amendments and due consideration has been given to all matter presented.

Since these amendments relieve a restriction and extend a compliance date and do not impose an additional burden on affected person, good cause exists for making them effective in less than 30 days.

These amendments are made under the authority of sections 313(a), 601, 603, 604, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1423, 1424, and 1425), and section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

In consideration of the foregoing, Parts 43 and 91 of the Federal Aviation Regulations are amended as follows, effective December 31, 1973.

Amendment 43–19

Operations Review Program

Amendment No. 4: Miscellaneous Amendments

Adopted: May 19, 1978 **Effective: June 26, 1978**

(Published in 43 FR 22636, May 25, 1978)

SUMMARY: The purpose of these amendments is to update and improve regulations concerning aircraft maintenance, airmen certification, and general operating and flight rules, parachuting, certification and operation of air carriers and commercial operators, air travel clubs, agricultural aircraft operations, repair stations, and aviation maintenance technical schools. These amendments are part of the Operations Review Program.

FOR FURTHER INFORMATION CONTACT:

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Federal Aviation Administration, 800 Independence Avenue, S.W.,
Washington, D.C. 20591; telephone: 202–755–8715.

SUPLEMENTARY INFORMATION:

HISTORY

These amendments are the fourth in a series of amendments to be issued as a part of the Operations Review Program. The following series of amendments have previously been issued as part of the Operations Review Program:

Title	*FR Citation*
Clarifying and editorial changes	(41 FR 47227; October 28, 1976)
Rotorcraft External-Load Operations	(42 FR 24196; May 12, 1977 amended by 42 FR 32531; June 27, 1977)
Airspace, Air Traffic and General Operating Rules	(To be issued at a later date)

These amendments are based on a Notice of Proposed Rule Making (Notice 76–28) published in the Federal Register on December 27, 1976, (41 FR 56280). All interested persons have been afforded an opportunity to participate in the making of these amendments and due consideration has been given to all matters presented. A number of substantive changes and changes of an editorial and clarifying nature have been made to the proposed rules based upon relevant comments received and upon further review by the FAA. Except for minor editorial and clarifying changes and the substantive changes discussed below, these amendments and reasons for their adoption are the same as those contained in Notice 76–28.

Five proposals which were contained in Notice 76–28, pertaining to Part 135, Air Taxi Operators and Commercial Operators of Small Aircraft, are not being dealt with here. They will be considered in conjunction with the proposals contained in Part 135 Regulatory Review Program, Notice No. 77–17: Air Taxi Operators and Commercial Operators (42 FR 43490; August 29, 1977).

Amendments to § 121.343(d), § 121.359(e), § 121.703(f), §127.127(d), and § 127.313(f) were not included in Notice 76–28. Since these amendments are editorial changes which reflect the National Transportation Safety Board's revised regulations, they are included in this amendment.

DISCUSSION OF COMMENTS

The following discussion is keyed to the like-numbered proposals contained in Notice 76–28.

Proposal 4–1. One commenter suggested that the word "knowingly" be inserted between "may" and "make" in paragraph (a) of proposed § 43.12 to clarify the intent behind the meaning of the word "fraudulent". The FAA does not believe it is necessary

to add the word "knowingly" since the proof of a fraudulent act is based on the person knowingly committing the act. Accordingly, the proposal is adopted without substantive change.

Proposal 4–2. No unfavorable comments were received on the proposal to revise paragraph (b)(2)) of Appendix E to Part 43. Accordingly, the proposal is adopted without substantive change.

Proposal 4–3. One commenter recommended clarification of the first paragraph of Appendix F to Part 43 which refers to an additional 3 decibel (db) tolerance allowed to compensate for antenna coupling errors during receiver sensitivity measurements. The commenter states this has been interpreted by some to mean ±1½db and by others to mean ±3db. After review, the FAA agrees and the proposed rule is changed by substituting the word "loss" for "tolerance."

After further review of paragraph (a), Appendix F to Part 43, the FAA believes the words "of the system" should be inserted between the words "frequency" and "is" to clarify that the antenna should be used during the transponder frequency check. Accordingly, proposed Appendix F to Part 43 is adopted as proposed except for the revisions discussed above.

Proposal 4–4. One commenter was against extending the effective date of a temporary certificate from 90 days to 120 days and suggested that the FAA's certificate handling facilities should be improved to provide more rapid service. The FAA believes that an addition of 30 days is necessary to handle the numerous applications received and to avoid the need for applicants to obtain renewal of the temporary certificate. The proposed change to § 61.17(a) with respect to inserting the number "120" in place of "90" was also proposed for § 63.13 and § 65.13 (Proposals 4–5 and 4–11 respectively) and commented on as above. Accordingly, proposed §§ 61.17(a), 63.13 and 65.13 are adopted without substantive change.

Proposal 4–5. For a discussion of comments related to the proposal to amend § 63.13 and for the disposition of that proposal, see Proposal 4–4.

Proposal 4–6. A comment was received which discussed matters not proposed in Notice 76–28. This comment is beyond the scope of the Notice and cannot be considered without further notice and public participation. For a discussion of comments related to proposed § 63.41(b) and for the withdrawal of that proposal, see Proposal 4–12.

Proposal 4–7. No unfavorable comments were received on the proposal to delete § 63.53(b) and (c). Accordingly, the proposal is adopted without substantive change.

Proposal 4–8. No unfavorable comments were received on the proposal to amend § 63.57(a) and therefore it is adopted without substantive change. However, the FAA believes the words "any part of" and "except the section on plotting and computing" in § 63.57(b) should be deleted since they are rendered unnecessary by the amendment to § 63.53 (see Proposal 4–7). Accordingly, the words discussed above are deleted from § 63.57(b).

Proposal 4–9. No unfavorable comments were received on the proposal to revise § 63.59(b) or (c) and the proposal is adopted without substantive change. For comments related to proposed § 63.59(a)(2) and deletion of the phrase "in the case of applicant's first failure" in proposed § 63.59(a)(2), see Proposal 4–12.

Proposal 4–10. Although there were no unfavorable comments to the proposed revision of Appendix A of Part 63, the FAA believes the proposal should be withdrawn since a substantial portion of the rule was inadvertently omitted. Accordingly, the proposal to revise Appendix A of Part 63 is withdrawn.

Proposal 4–11. For a discussion of comments relating to the proposal to amend § 65.13 and for the disposition of that proposal, see Proposal 4–4.

Proposal 4–12. Thirty-nine comments objected to the proposed amendments to § 65.19. Many commenters objected to limiting the number of retests to one within 30 days as proposed in § 65.19(b) in case of an applicant's first failure. These commenters stated that this restriction would place an unnecessary burden on applicants by increasing the time for certification without a commensurate increase in benefits or safety. Upon further review, the FAA agrees and the phrase "In the case of an applicant's first failure" in proposed § 65.19(b) is deleted.

The proposed change to § 65.19(b) with respect to the phrase "In the case of an applicant's first failure" is identical to the proposed change to §§ 63.41(b) and 63.59(a)(2) in Proposals 4–6 and 4–9 respectively. Accordingly, the proposed change to § 63.41(b) is withdrawn and the proposed change to § 63.59(a)(2) is amended to delete the above phrase.

Several commenters objected to proposed § 65.19(b) because it denied certified ground instructors the privilege of giving additional instruction to applicants in preparing them for retesting. The commenters stated that ground instructors were the only persons, other than flight instructors, who have been tested on their ability to teach various technical subjects. The FAA does not issue ground instructor ratings which are appropriate to teach air traffic control tower operator, aircraft dispatcher, parachute rigger, or mechanic applicants.

Since aviation safety and public interest demands that only persons who have demonstrated their technical knowledge and skill for a particular certificate should be qualified to provide instruction and certify competency for that certificate, the FAA believes the instructor must possess at least the same certificate and rating that the applicant is seeking to obtain. Accordingly, the proposal to amend § 65.19 is adopted as proposed with the revision discussed above.

Proposal 4–13. One commenter believed § 91.8 should be further expanded to include the prohibition against the interference with flight crewmembers before the aircraft is boarded. Since such a prohibition would be difficult to enforce and could give rise to jurisdictional problems, the FAA does not consider this prohibition a proper subject for rulemaking.

One commenter stated that proposed § 91.8(b) could apply to an aircraft owner who might ask the pilot to alter course or change destination. The commenter suggests clarifying the language. Another commenter expressed concern for the proposed wording of § 91.8(b) since it appears that a pilot examiner would be in violation by asking a private pilot applicant to divert from a course during a flight test. This was not the FAA's intent. The prohibition was directed toward unreasonable requirements, such as hijacking or requiring a change under duress. However, after further review, the FAA believes § 91.8(b) is not necessary since these acts are provided for in § 91.8(a). Accordingly, the proposal is adopted with the revisions discussed.

Proposal 4–14. No unfavorable comments were received on the proposal to revise § 91.15(a)(2). Accordingly, the proposal is adopted without substantive change.

Proposal 4–15. No unfavorable comments were received on the proposal to amend § 91.17. Accordingly, the proposal is adopted without substantive change.

Proposal 4–16. No unfavorable comments were received on the proposal to revise § 91.18(a). Accordingly, the proposal is adopted without substantive change.

Proposal 4–17. No unfavorable comments were received on the proposed revision to § 91.43(b). Accordingly, the proposal is adopted without substantive change.

Proposal 4–18. One commenter disagreed with the proposed revision to § 91.52(d)(2) that would require the new expiration date for replacement (or recharge) of the emergency locator transmitter's battery to be entered in the aircraft maintenance record and suggested the use of a placard located inside the cabin as a better solution. The FAA believes that a maintenance record entry is a more reliable method of determining the replacement date than a placard. Accordingly, proposed § 91.52(d)(2) is adopted without substantive change.

Proposal 4–19. Several commenters contended that proposed § 91.73(d) would be too restrictive and does not allow sufficient discretionary authority to the pilot in command as to when the anticollision lights should or should not be lighted. They state that the use of a strobe light as an anticollision light would create an unsafe condition during certain aircraft operation such as taxiing, takeoff and landing, if the pilot did not have the option to turn it off except during adverse meteorological conditions.

In light of these comments and upon further review, the FAA agrees that there are instances when the use of a high intensity anticollision light could induce vertigo

and cause spatial disorientation. Accordingly, § 91.73(d) is revised to provide that the pilot in command may turn off the anticollision lights at any time in the interests of safety.

Proposal 4–20. One commenter does not believe the word "nearest" in proposed § 91.83(d) conveys the operational procedure presently used by the FAA, and suggested it be changed. In light of this comment, and after further review, the FAA believes that any restrictive term is unnecessary and could possibly discourage the filing of flight plans. Accordingly, the words "the nearest" in proposed § 91.83(d) are deleted and the word "an" inserted.

Proposal 4–21. One commenter objected to the wording of proposed § 91.173 on the ground that it places an unwarranted burden on the owner or operator to determine such items as revision date, airworthiness directive (AD) number, and if an AD involves recurring action, the time and date when the next action is required. The commenter further stated that § 91.173 places responsibility on the owner or operator for the content of Part 43 maintenance record entries made by persons authorized by the FAA.

The FAA believes that the owner or operator should be responsible for the retention of the required maintenance records for the specified periods and furnish such records to the person authorized by the FAA to accomplish the work. The FAA believes that the owner or operator should also ensure that the appropriate information as prescribed in § 91.173 is entered in the maintenance records. The intent of the proposal is to require the retention of more specific information relating to ADS and their compliance. In addition, each person authorized to perform the maintenance is only responsible for the content of the required record entries. Accordingly, the proposed revisions to § 91.173(a), (b), and (a)(2)(v) and the addition of new (b)(3) are adopted without substantive change.

Proposal 4–22. One commenter who supported the proposed § 91.189(b)(5) suggested that attachment points for the lifeline be permanently installed on the wings of the aircraft. The FAA believes current § 25.1411(g) adequately covers lifeline attachment. Accordingly, proposed § 91.189(b)(5) is adopted without substantive change.

Proposal 4–23. The only public comment received on the proposal to amend paragraph 2(a)(7) of Appendix A to Part 91 recommended that radio altimeters be included in the proposed requirement but gave no further explanation. Since radio altimeters have markings at 20 feet or less intervals, the FAA believes that no reason exists at this time to include them in this amendment. Accordingly, the proposal is adopted without substantive change.

Proposal 4–24. No unfavorable comments were received on the proposal to revise § 105.15(b). Accordingly, the proposal is adopted without substantive change.

Proposal 4–25. One commenter supported proposed § 105.33(a) and (b) providing adequate exceptions exist for emergency situations, but did not state what type of exceptions he was referring to.

Another commenter contends that a light should not be displayed during free-fall because such a light decreases night vision and could possibly induce vertigo or spatial disorientation.

The FAA does not believe that such a light would significantly decrease night vision and induce vertigo or spatial disorientation. The FAA believes that a parachute jumper presents an object in the airspace from the instant the jumper exits the aircraft until the jumper reaches the surface. All that changes with the deployment of the chute is the speed the object is falling. A free-fall jump can extend through thousands of feet of airspace, presenting a hazard to air navigation. Accordingly, in the interest of safety, proposed § 105.33(a) and (b) are adopted without substantive change.

Proposal 4–26. No unfavorable comments were received on the proposal to amend § 105.43. Accordingly, the proposal is adopted without substantive change.

Proposal 4–27. No unfavorable comments were received on the proposal to revise § 121.11. Accordingly, the proposal is adopted without substantive change

Proposal 4–28. No unfavorable comments were received on the proposal to amend § 121.26. Accordingly, the proposal is adopted without substantive change.

Proposal 4–29. No comments were received on the proposal to revise § 121.29(b). After further review, the FAA believes there is no current need for the proposed revision. Accordingly, proposed § 121.29(b) is withdrawn.

Proposal 4–30. No unfavorable comments were received on the proposal to amend § 121.47(a). Accordingly, the proposal is adopted without substantive change.

Proposal 4–31. No comments were received on the proposal to revise § 121.53(e). After further review, the FAA believes there is no current need for the proposed revision. Accordingly, proposed § 121.53(e) is withdrawn.

Proposal 4–32. No favorable comments were received on the proposal to revise § 121.61(b)(1). Accordingly, the proposal is adopted without substantive change.

Proposal 4–33. No unfavorable comments were received on the proposal to amend § 121.135(b)(6) and (7). Accordingly, the proposal is adopted without substantive change.

Proposal 4–34. No unfavorable comments were received on the proposal to amend § 121.191(a). Accordingly, the proposal is adopted without substantive change.

Proposal 4–35. The commenters to proposed § 121.309(b)(4) contend the proposal was unnecessarily redundant, served no useful purpose, and did not enhance safety. The commenters objected to this proposal from the standpoint that it would impose: (1) an unwarranted recordkeeping burden on operators utilizing an equipment control program that is controlled by hours or cycles and not by a specific inspection due date; (2) a risk of not having the inspection dates marked on the containers when equipment items were transferred from one airplane to another; and (3) an additional task of changing inspection dates with possible resultant error.

In light of these comments and after further review, the FAA believes the proposal would possibly impose a burden not commensurate with its probable contribution to safety. Accordingly, proposed § 121.309(b)(4) is withdrawn.

Proposal 4–36. One commenter suggested the use of the phrase "no person" instead of "no passenger or crewmember" in proposed § 121.317(b). The FAA believes the phrase "no passenger or crewmember" is more definitive and the proposed wording is retained. Another commenter objected to the proposal on the grounds that there are instances when it is acceptable for cockpit crewmembers to continue to smoke and stated that this determination should be left up to the discretion of the cockpit crewmembers. The FAA disagrees. As a safety factor, flight crewmembers should be prohibited from smoking when the "no smoking" sign is lighted. Accordingly, proposed § 121.317(a) and (b) is adopted without substantive change.

Proposal 4–37. No unfavorable comments were received on the proposal to amend § 121.401(c). Accordingly, the proposal is adopted without substantive change.

Proposal 4–38. No unfavorable comments were received on the proposal to revise § 121.440(b)(2). Accordingly, the proposal is adopted without substantive change.

Proposal 4–39. Two comments were received on both proposed §§ 121.548 and 127.212 which discussed matters not proposed in Notice 76–28. These comments are beyond the scope of the Notice and cannot be considered without further notice and public participation. Accordingly, proposed § 121.548 and § 127.212 (Proposals 4–39 and 4–54 respectively) are adopted without substantive change.

Proposal 4–40. No unfavorable comments were received on the proposal to amend § 121.651(d)(2). Accordingly, the proposal is adopted without change.

Proposal 4–41. No unfavorable comments were received on the proposal to amend § 121.652(a). However, as stated in the preamble to Notice 76–28, the FAA believes the flight time, in order to be credited, must be acquired in the same "type" airplane. Accordingly, the proposal is adopted by inserting the word "type" to further clarify the intent of the rule.

Proposal 4–42. No unfavorable comments were received on the proposal to amend § 121.697(e)(2). Accordingly, the proposal is adopted without substantive change.

Proposal 4–43. No unfavorable comments were received on the proposal to revise § 121.723(a) and (b). However, in order to avoid the reissuance of certificates at the conclusion of each assignment, the wording is changed so that the certificate is retained

until termination of employment with the carrier or operator. Accordingly, the proposal is adopted with the change discussed.

Proposal 4–44. No unfavorable comments were received on the proposal to add a new § 123.11(b)(3). Accordingly, the proposal is adopted without substantive change.

Proposal 4–45. No unfavorable comments were received on the proposal to add a new § 123.12. Accordingly, the proposal is adopted without substantive change.

Proposal 4–46. No unfavorable comments were received on the proposal to revise § 123.13. Accordingly, the proposal is adopted without substantial change.

Proposal 4–47. No unfavorable comments were received on the proposal to revise § 123.15(a). Accordingly, the proposal is adopted without substantive change.

Proposal 4–48. No comments were received on the proposal to revise § 123.19(c). After further review, the FAA believes there is no current need for the proposed revision. Accordingly, proposed § 123.19(c) is withdrawn.

Proposal 4–49. No unfavorable comments were received on the proposal to revise § 123.27. Accordingly, the proposal is adopted without substantive change.

Proposal 4–50. No unfavorable comments were received on the proposal to revise § 123.41(a)(1). Accordingly, the proposal is adopted without substantive change.

Proposal 4–51. No unfavorable comments were received on the proposal to revise § 127.3. Accordingly, the proposal is adopted without substantive change.

Proposal 4–52. No comments were received on the proposal to revise § 127.21(b). After further review, the FAA believes there is no current need for the proposed revision. Accordingly, proposed § 127.21(b) is withdrawn.

Proposal 4–53. No unfavorable comments were received on the proposal to revise § 127.151(a). Accordingly, the proposal is adopted without substantive change.

Proposal 4–54. For a discussion of comments relating to proposed § 127.212 and for the disposition of that proposal, see Proposal 4–39.

Proposal 4–55. No unfavorable comments were received on the proposal to revise § 127.249(b). Accordingly, the proposal is adopted without substantive change.

Proposals 4–56 through 4–60. These proposals are included in the Part 135 Regulatory Review Notice 77–17: Air Taxi Operators and Commercial Operators (42 FR 43490; August 29, 1977). Comments received on the proposed amendments to Part 135 in Notice 76–28 will be considered in conjunction with other comments received in response to Notice 77–17.

Proposal 4–61. No unfavorable comments were received on the proposal to amend § 137.19(e). Accordingly, the proposal is adopted without substantive change.

Proposal 4–62. No unfavorable comments were received on the proposal to delete Part 149 "Parachute Lofts" and transfer those requirements to a new Subpart E in Part 145. However, after further review, the FAA believes the incorporation of Part 149 into Part 145 as proposed would create redundancy in the rules and cause confusion. Accordingly, the proposal to amend Part 145 is withdrawn.

Proposal 4–63. No unfavorable comments were received on the proposal to revise § 145.17(b). After further review, the FAA believes the words "surrendered, suspended, or," should be reinserted between the words "sooner" and "revoked" in § 145.17(b) since they appear in current § 145.17(b). This oversight is corrected in the adopted rule since it was not a change intended by the proposal. Accordingly, the proposal to revise § 145.17(b) is adopted as proposed except for the revision discussed above.

Proposal 4–64. No unfavorable comments were received on the proposal to amend § 145.59(a). Accordingly, the proposal is adopted without substantive change.

Proposal 4–65. No unfavorable comments were received on the proposal to revise § 147.31(c)(1) and to add a new § 147.31(c)(2). After further review, the FAA believes that the following editorial changes should be made: (1) in the proposed § 147.31(c)(1)(ii) the word "accreditation" is used in place of the word "certification" which appears in current § 147.31(c)(1). This oversight is corrected in the adopted rule since it was not the intent of the proposal to change the wording to accreditation; (2) the phrase "other than the crediting school" immediately following the word "accreditation" in proposed § 147.31(c)(1)(ii) was inadvertantly omitted and has been

included in the final rule. Accordingly, the proposal to revise § 147.31(c)(1) and to add a new § 147.31(c)(2) is adopted as proposed except for the revisions discussed above.

Proposal 4–66. Although there were no unfavorable comments to the proposed deletion and reservation of Part 149, the proposal is withdrawn for the reasons discussed in Proposal 4–62.

DRAFTING INFORMATION

The principal authors of this document are Thomas G. Walenta, Flight Standards Service, and Richard B. Elwell, Office of General Counsel.

ADOPTION OF THE AMENDMENTS

Accordingly, Parts 43, 61, 63, 65, 91, 105, 121, 123, 127, 137, 145, and 147 of the Federal Aviation Regulations (14 CFR Parts 43, 61, 63, 65, 91, 105, 121, 123, 127, 137, 145, and 147) are amended as follows, effective June 26, 1978.

(Secs. 313, 314, and 601 through 610 of the Federal Aviation Act of 1958 (49 U.S.C. 1354, 1355, and 1421 through 1430) and Sec. 6(c) of the Department of Transportation Act (41 U.S.C. 1655)).)

NOTE.—The Federal Aviation Administration has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended by Executive Order 11949, and OMB Circular A–107.

Amendment 43-20

Airworthiness Review Program—Amendment No. 8A: Aircraft, Engine, and Propeller Airworthiness, and Procedural Amendments

Adopted: August 27, 1980 **Effective: October 14, 1980**

(Published in 45 FR 60154, September 11, 1980)

SUMMARY: These amendments to the Federal Aviation Regulations update and improve the airworthiness standards applicable to the type certification of aircraft, engines, propellers, related operating rules, and procedural requirements. These amendments are part of the Airworthiness Review Program.

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SUPPLEMENTARY INFORMATION:

These amendments are the ninth and last in a series of amendments issued as part of the Airworthiness Review Program. The following amendments have previously been issued as part of this program:

Title and FEDERAL REGISTER (FR) Citation

Amendment No. 1: Form Number and Clarifying Revisions (40 FR 2576; Jan. 14, 1975)

Amendment No. 2: Rotorcraft Anticollision Light Standards (41 FR 5290; Feb. 5, 1976)

Amendment No. 3: Miscellaneous Amendments (41 FR 55454; Dec. 20, 1976)

Amendment No. 4: Powerplant Amendments (42 FR 15034; March 17, 1977)

Amendment No. 5: Equipment and Systems Amendments (42 FR 36960; July 18, 1977)

Amendment No. 6: Flight Amendments (43 FR 2302; Jan. 16, 1978)

Amendment No. 7: Airframe Amendments (43 FR 50578; Oct. 30, 1978)

Amendment No. 8: Cabin Safety and Flight Attendant Amendments (45 FR 7750; Feb. 4, 1980)

These amendments are for the most part based on Notice 75-31 which was published in the FEDERAL REGISTER on July 11, 1975 (40 FR 29410), as well as a number of proposals contained in the following notices of proposed rule making: Notice 75-10 (40 FR 10802; March 7, 1975); Notice 75-19 (40 FR 21866; May 19, 1975); and Notice 75-26 (40 FR 24802; June 10, 1975). Amendments based on the latter three notices have already been issued as a part of the Airworthiness Review Program, specifically those titled Miscellaneous Amendments, Powerplant Amendments, and Airframe Amendments, respectively. Final action on certain of the proposals was deferred, however, at the time the amendments were issued as further consideration and review of these proposals was considered necessary. In other cases, final action was deferred so that they could be considered together with related proposals contained in other notices.

Certain proposals identified as Group 2 in Appendix I to Notice 75-31 were deferred to be dealt with in a later notice as a part of the Airworthiness Review Program. These proposals all addressed the concept of periodically updating the certification basis of airplane models in long-term production. Such recertification every five or ten years would be intended to ensure that the level of safety of all airplanes in service keep pace with the current level of safety expectations. The FAA has now determined that these proposals more appropriately should be examined as a separate issue in a future regulatory action. Accordingly, the proposals identified as Group 2 in Appendix 1 to Notice 75-31 are being dropped from the Airworthiness Review Program.

Proposals relating to cabin safety and flight attendants, which are identified in this amendment, were extracted from Notice 75-31 (40 FR 29410; July 11, 1975) and handled on an expedited basis. Those rules were published in the Cabin Safety and Flight Attendant Amendments (45 FR 7750; February 4, 1980).

Interested persons have been given an opportunity to participate in the making of these amendments and due consideration has been given to all matters presented. The proposals and comments are discussed below. Substantive changes and changes of an editorial and clarifying nature have been made to the proposed rules based upon relevant comments received and further review within the FAA. Except for minor editorial and clarifying changes and the substantive changes discussed below, these amendments and the reasons for them are the same as those contained in Notices 75-10, 75-19, 75-26, and 75-31.

DISCUSSION OF COMMENTS

The following discussions are keyed to the like-numbered proposals contained in Notices 75-10, 75-19, 75-26, and 75-31, and are presented in the same order as the corresponding amendments found in the rules portion of this document.

Proposal 8-1. The proposal to amend § 1.1 in order to transfer the definitions for rated power and thrust to a new § 33.6 is withdrawn. It is considered that such a change may introduce confusion in the administration of aircraft certification rules. See also Proposal 8-94.

Proposal 8-2. Several commenters object to proposed § 21.16(a) which would delete reference to a "novel and unusual design feature" as a necessary condition for the Administrator to issue special conditions. Special conditions become a part of the designated applicable regulations for type certification of a particular product (aircraft, aircraft engine, or propeller).

One commenter indicates that the proposed revision is unjustified and would lead to indiscriminate rule making, and that instead of simplifying the administration of the requirements it would introduce complexity. Another commenter claims that adoption of proposed § 21.16(a) would introduce uncertainty into design requirements.

One commenter suggests that in lieu of revising § 21.16, the FAA should perform a study of § 21.21(b)(2). (Section 21.21(b)(2) provides for denial of a type certificate if an unsafe feature or characteristic exists in the design under consideration. Before adoption of § 21.16, FAA used § 21.21(b)(2) to issue special conditions in letter form.) This commenter suggests that if § 21.21(b)(2) were to continue to be used to issue special conditions to cover an unsafe design feature or characteristic that is not "novel or unusual," it must be equally applicable to a condition that exists on more than one (earlier certificated) product, further stating that the other product or products must then have been type certificated using existing rules which did not adequately cover the unsafe design feature or characteristic. On this premise, the same commenter asks several relevant questions. When § 21.21(b)(2) is applied, does the FAA make it retroactive to the other involved models? Are Airworthiness Directives (Part 39) issued? Why wasn't a special condition issued against the first applicant when the condition was, in fact, novel or unusual? Why was this not followed by a notice of proposed rule making for future application?

These comments and questions caused the FAA to completely reevaluate its practices in designating the applicable regulations for type certification under § 21.17(a), commonly referred to as defining a "type certification basis."

After further consideration of the comments received as well as FAA practice in designating the applicable regulations, and the objectives of proposed § 21.16, the FAA agrees that this proposal should be withdrawn because of the potential for possible abuse of general rulemaking procedures, of the requirements of the Administrative Procedure Act, and the intent of Executive Order 12044. As explained below, the objectives of proposed § 21.16 will be satisfied by the application of a new FAA policy affecting the designation of applicable regulations for the type certification of new aircraft, aircraft

engines, and propeller designs. These future practices are consistent with the FAA General Rule-Making Procedures of Part 11, the Administrative Procedure Act, and Executive Order 12044.

Section 21.16 is one paragraph of a number of paragraphs used to define the type certification basis of a new product. Companion paragraphs of importance to this discussion include §§ 21.17 and 21.21. Section 21.17(a) provides that the applicable airworthiness standards are (1) those requirements of this subchapter that are effective on the date of application for a type certificate, unless otherwise specified by the Administrator or unless compliance with later effective amendments is elected by the applicant or required by special retroactive regulations (e.g., § 25.2), and (2) any special conditions prescribed by the Administrator in accordance with § 21.16. Section 21.16 provides for the issuance of special conditions when the Administrator finds that the existing airworthiness standards do not contain adequate or appropriate safety standards *because of novel or unusual design features* of the product to be type certificated. Section 21.21(b) (1) permits noncompliance with specific provisions of the airworthiness standards when there are compensating factors that provide an equivalent level of safety. Such determinations are commonly referred to as "equivalent safety findings." Section 21.21(b) (2) provides for the denial of a type certificate, notwithstanding a showing of compliance with the applicable airworthiness standards designated in accordance with § 21.17, if the Administrator finds an unsafe feature or characteristic of the product for the category in which certification is requested.

Sections 21.16, 21.17, and 21.21, taken together with FAA policy in designating the applicable regulations must recognize and balance four important considerations: (1) the FAA has an obligation under Section 601 of the Federal Aviation Act of 1958 to keep the airworthiness standards of this subchapter (i.e., FARs 23, 25, 27, 29, 31, 33, and 35) as current as practicable; (2) the type certificate applicant has a right and a need to know, in very specific terms, what the applicable airworthiness standards will be in order to finalize the detail design of its product and to enable the applicant to make reasonable performance guarantees to its potential customers; (3) in the interests of safety, rapid technological advances presently being made by the civil aircraft industry require that the FAA be able to issue special conditions to address truly novel or unusual design features that it has, as yet, not had an adequate opportunity to envisage in the airworthiness standards through the general rulemaking process; and (4) because the airworthiness standards of this subchapter are intentionally objective in nature to allow flexibility in design, the FAA must retain the prerogatives both to make equivalent safety findings and to deny a type certificate whenever an unsafe design feature or characteristic is found during the type certification process.

The phrase "novel or unusual" as used in § 21.16 is a very relative term. As used hereafter in applying § 21.16 to justify the issuance of special conditions, "novel or unusual" will be taken with respect to the state of technology envisaged by the applicable airworthiness standards of this subchapter. It must be recognized that in some areas which will vary from time to time the state of the regulations may somewhat lag the state of the art in new design because of the rapidity in which the state of the art is advancing in civil aeronautical design and because of the time required to develop the experience base needed by the FAA to proceed with general rule making. Applicants for type certification of a new design have the opportunity to mitigate the impact of not knowing the precise airworthiness standards to be applied for "novel or unusual design features" by consulting with the FAA early in their certification planning when such features are suspected or known by the applicant to exist. It should also be recognized that, because of the intentional objective nature of the airworthiness standards of this subchapter, many new design features which might be thought of as "novel or unusual design features" may already be adequately covered by existing regulations, thus obviating the need to issue special conditions.

Henceforth, the special condition will not be issued for general upgrading of the applicable airworthiness standards when novel or unusual design features are not

involved. Whenever the FAA determines that an upgrading of the airworthiness standards of this subchapter is warranted, the upgrading will be promulgated as an amendment to this subchapter consistent with the general rulemaking procedures of FAR Part 11, the Administrative Procedure Act, and Executive Order 12044. Should the FAA conclude that there is a compelling safety need to apply a proposed amendment retroactively to designs already type certificated or to designs for which a type certificate application is in progress, the retroactive aspects of the proposed amendment, if supportable by a regulatory analysis completed in accordance with Executive Order 12044, will be announced in the notice or proposed rule making for that amendment. Public comments on the proposed retroactive aspects will be considered in determining the applicability of the adopted rule.

A number of products for which special conditions have not as yet been issued are undergoing type certification at the time of this amendment. Should the FAA conclude that recent or future amendments to this subchapter should be applied to these products that would not otherwise be applicable under § 21.17(a) (1) then an amendment to require retroactive application will be proposed and acted upon through the general rulemaking process explained above, in lieu of issuing special conditions under § 21.16.

Also, the provisions of § 21.21(b) (2) will no longer be used to justify the issuance of special conditions. However, just as an Airworthiness Directive may be issued under Part 39 to require the correction of an unsafe condition that is likely to exist or develop in a product of the same type design, notwithstanding a showing of compliance with the applicable airworthiness standards, § 21.21(b) (2) may continue to be used to deny issuance of a type certificate if a similar unsafe feature or characteristic is found during the type certification process, notwithstanding a showing of compliance with requirements designated by § 21.17. The unsafe features and characteristics envisaged by § 21.21(b) (2) are those related to specific design configuration or product characteristics of a particular design, that one would not normally expect the applicable airworthiness standards to specifically preclude because of their intentionally objective nature.

It is the practice of the FAA to develop and publish a Type Certificate Data Sheet as an integral part of each type certificate. The type certification basis is recorded on the Type Certificate Data Sheet for public information. In the future the type certification basis statement will identify not only the applicable regulation, including special conditions, but also will identify all exemptions issued pursuant to Part 11, together with "equivalent safety findings" made in accordance with § 21.21(b) (1).

For the above reasons, Proposal 8–2 is withdrawn.

In considering its disposition of the proposal to amend § 21.16(a), the FAA realizes that a "novel or unusual design feature" today may become a common design feature of the future. The issuance of a like special condition for several product designs will most likely compel general rule making on that subject and the history of that special condition could have a very strong influence on thinking when general rule making is initiated. Also, although special conditions are regulations of particular product applicability, they are issued only in the interest of public safety. For these reasons, Part 11, and § 21.16 of Part 21 are amended to require special conditions to be issued in accordance with the existing general rule-making procedures. As is now the case, a docket will continue to be maintained for each set of special conditions, and all material in the docket will continue to be available for public review.

Proposal 8–3. This proposal is one of a group of proposals dealing with the establishment of Instructions for Continued Airworthiness and the responsibilities of maintenance personnel and aircraft operators with respect to those instructions. The group is made up of the following proposals: 8–3, 8–5, 8–21, 8–25, 8–58, 8–62, 8–64, 8–67, 8–77, 8–80, 8–89, 8–91, 8–92, 8–93, 8–97, 8–98, 8–99, 8–104, 8–106, 8–107, 8–110, and 8–111.

A commenter representing a number of scheduled air carriers objects to the requirement in § 21.31(c) that the type design include the Airworthiness Limitations

section of the Instructions for Continued Airworthiness because of the information to be included in that section. Although this commenter does not object to including mandatory replacement times for life-limited parts in the Airworthiness Limitations section, the commenter strongly objects to including inspection intervals and related procedures. Under proposed §§ 43.16 and 91.163(c), the commenter points out, air carriers would be required to comply with these maintenance-related airworthiness limitations. The FAA does not agree that inspection intervals and related procedures can be omitted from the Airworthiness Limitations section of the Instructions for Continued Airworthiness. For example, the proposed Airworthiness Limitations section on a transport category airplane must contain mandatory inspection intervals and related procedures because the damage-tolerance concept described in § 25.571 is predicated upon the use of such inspections to detect initial cracks in principal structural elements before crack growth under repeated loads could progress to a degree which would cause catastrophic failure of the airplane. However, the FAA does agree that §§ 43.16 and 91.163(c) should permit modification of these intervals and procedures by other FAA approved methods. Accordingly, inspection programs approved under §§ 121.25(b), 121.45, 121.367, 123.21(b), 127.13(b), 127.133, 135.5, 135.17, 135.419, 135.421, and 135.425, as defined by approved operations specifications, or an inspection program approved under § 91.217(e) constitute acceptable alternatives. The appendices to Parts 23, 25, 29, 31, 33, and 35 as adopted in this amendment require the applicant to specify (in the Airworthiness Limitations section) mandatory replacement times, inspection intervals, and related procedures. Sections 43.16 and 91.163(c) have been revised to show that only the inspection times and procedures may be adjusted under approved alternative programs.

A commenter objects to § 21.31(c), which in general is applicable to manufacturers, since continued airworthiness, which is covered in the paragraph, is the responsibility of the operator. Because this comment pertains more directly to § 21.50, it is dealt with in conjunction with Proposal 8–5.

In addition to comments relating to the Instructions for Continued Airworthiness, a commenter objects to § 21.31(a) because the proposal to include a list of drawings and specifications in the type design was not mentioned at the Airworthiness Review Conference. In fact, this proposal did appear as an FAA comment on Proposal No. 565 in the Committee I Workbook (titled "Procedures and Special Subjects") made available to all participants at the conference, and may be found in the docket.

Several commenters object to § 21.31(d) because including analyses in the type design—(1) would be redundant, since it is already required as part of the substantiating data; (2) is unnecessary, since the drawings and specifications required under current § 21.31(a) provide the general information needed by the FAA; and (3) introduces the possibility that the FAA would require the manufacturer to provide any and all data used to prepare the drawings and specifications, thereby delaying type certification. The FAA agrees that proposed § 21.31(d) would serve no useful purpose and it is withdrawn.

Proposal 8–4. A commenter objects that § 21.35(b)(2) eliminates flight testing for reliability, contending that analysis and ground test are not dependable as a basis for certification. In the light of this comment, and after further consideration and experience, the FAA has determined that flight testing for reliability does provide safety information not necessarily obtainable from analysis and ground test. Accordingly, the proposal to delete the reference to reliability in § 21.35(b)(2) is withdrawn.

No adverse comment was received on the proposal to replace the word "airplanes" in § 21.35(b)(2) with the word "aircraft" and this amendment to § 21.35(b)(2) is adopted without change.

Proposal 8–5. A commenter objects to the continued airworthiness provisions of § 21.50(b) (and also proposed § 21.31(c)) contending that—(1) continued airworthiness is the responsibility of the operator/owner; (2) current regulations in Parts 23 and 25 already require manufacturers to make available recommended maintenance procedures for the product at the time of its delivery; (3) current operating rules require the operator/owner to establish and comply with a maintenance program; and (4) with respect

to transport airplanes, the present FAA Maintenance Review Board (MRB) system is an entirely satisfactory way of establishing the means for maintaining airworthiness. Current FAA practice allows operators of new transport category airplanes to utilize FAA MRB recommendations (reference FAA Advisory Circular No. AC 121-22) for starting their maintenance programs, and then vary them with FAA approval as experience and operating conditions dictate. The commenter points out that, contrary to that practice, the amendment will require the manufacturer to obtain FAA approval of its recommended maintenance procedures before the airplane is type certificated, and to obtain FAA approval of revisions to those procedures (necessitated by any improvement change in the airplane) before approval of the change itself. This, the commenter states, will impose a severe and unnecessary hardship on the manufacturer.

On the first and second points, although the operator/owner does have responsibility for continued airworthiness, the FAA has found that the recommended maintenance procedures made available under current regulations are frequently inadequate in scope and content, and often do not provide a sound basis for the operator/owner to maintain the airworthiness of the aircraft. The FAA has concluded that the lack of such recommended maintenance procedures can best be remedied by requiring that they be made available to owners and operators by the type certificate or supplemental type certificate holder. On the third point, while it is true that not all operators/owners are required to establish and comply with a continuous airworthiness program, those that voluntarily wish to set up such a program are often handicapped by the lack of comprehensive instructions, which would be remedied by § 21.50(b). On the other hand, those required to establish a program will benefit from the more detailed and comprehensive instructions made available to them under § 21.50(b). On the fourth point, which is directed toward aircraft that will be maintained in accordance with an FAA approved operations specification and maintenance program under Parts 121, 123, 127, 135, or an approved inspection program under § 91.217(e), the FAA recognizes that these procedures for maintaining airworthiness of the products have functioned satisfactorily. In this regard, the FAA expects that operating segments of the air transportation industry would continue to work with type certification applicants in defining adequate maintenance instructions prior to type certification. The FAA MRB document, which is a product of contributions made by both the operators and manufacturer, could be picked up by the type design holder and included as a part of the required Instructions for Continued Airworthiness, thus continuing the usefulness of the existing MRB practices for the original entry into service of new product designs. Likewise, the additional maintenance instructions that would be required and which are not typical to MRB documents, but are presently required in air carrier operators' FAA approved maintenance programs, could also be picked up by the type design holder. Therefore, the screening process that would be utilized by the FAA in reviewing such maintenance documents would not unnecessarily delay type certification or approval of design changes after certification. See also the discussion under Proposal 8-3.

A commenter questions the need for the provision in § 21.50(b) requiring that the Airworthiness Limitations section of the Instructions for Continued Airworthiness be furnished with each aircraft, engine, or propeller. The FAA agrees that this provision is unnecessary, as the type certificate holder must make the manual available, and the operator/owner must comply. To require a manual to be furnished with each equipment would be redundant, and in some instances, would be unnecessary. Accordingly, the requirement that the Airworthiness Limitations section be furnished with each airplane or product is revised to require that the section be furnished to each owner of the type.

A commenter objects to § 21.50(b) insofar as it applies to rotorcraft type certificated under Parts 27 and 29, contending that the manufacturer is already required under those parts to furnish a maintenance manual, which has allegedly been proven adequate. The FAA does not agree. The proposed Instructions for Continued Airworthiness, which are broader in scope and more detailed than the maintenance manual currently required under Parts 27 and 29, would provide the operator/owner with the minimum amount of

information needed to maintain the airworthiness of increasingly complex rotorcraft currently being designed.

A commenter suggests that § 21.50(b) be revised to make it clear that an aircraft manufacturer need not supply Instructions for Continued Airworthiness pertaining to engines and propellers until the complete aircraft is delivered to the first retail purchaser. The continued airworthiness instructions for propellers and engines should be provided to the aircraft manufacturer to facilitate transmittal to purchasers of the aircraft.

A commenter notes that § 21.50(b) would require an aircraft manufacturer to make the Instructions for Continued Airworthiness available to the owner upon delivery of the aircraft and to any other person required to comply with any of the terms of those instructions *upon request*. Since such a request could be made before the first aircraft delivery, it could impose an unnecessary burden on the aircraft manufacturer. The commenter suggests that § 21.50(b) be revised so that such a request need not be filled until after delivery of an aircraft to the first owner. The FAA agrees that an early request for the Instructions for Continued Airworthiness could impose an unnecessary burden on the manufacturer. Additionally, the FAA notes that airplanes can be delivered to an operator, prior to full type certification, with a provisional airworthiness certificate to allow activities such as crew training, and therefore prior to the approval of the Airworthiness Limitations section. Accordingly, the phrase "upon request" has been deleted from § 21.50(b) and the language has been revised to require that at least one set of the complete Instructions for Continued Airworthiness be furnished upon delivery to the customer, or subsequent to issuance of the first standard certificate of airworthiness, whichever occurs later.

Proposal 8-6. Commenters object to the proposal to make § 21.97(b) applicable to all products rather than to engines only because—(1) the volume of paperwork would increase out of proportion to any benefits that might be gained; (2) the applications for supplemental type certificates would be significantly more complex, since there are frequently many configuration variations within an aircraft model and a fleet operator would have to list all of the configurations or make separate application for each; and (3) the term "specific configuration" must be defined if the proposal is to be properly administered. In light of these comments and after further consideration, the FAA concludes that this proposal requires additional study and it is withdrawn.

Proposal 8-7. No unfavorable comment was received on the proposal to amend § 21.123 to require a manufacturer to submit a manual describing its production inspection system and means for controlling materials and parts. Accordingly, the proposal is adopted without substantive change.

Proposal 8-8. A commenter objects to § 21.143(a)(2) contending that substitution of the word "supplier" for "subsidiary" introduces a major change to the requirements, involving increased paperwork and costs. The FAA does not agree. The FAA has consistently administered § 21.143(a)(2) as applying to *all* raw materials, purchased items, parts, and assemblies supplied to the prime manufacturer. The change does not involve increased paperwork or costs because it is a semantic change which clarifies the definition of persons or entities subject to the quality control data requirements of § 21.143, without expanding any of those requirements. The use of the term "subsidiary" is unclear because it implies that there must be a corporate connection between the prime manufacturer and his supplier. Accordingly, the language has been revised to reflect the FAA's intent that the quality control data requirements of § 21.143(a)(2) apply to all "suppliers" of each prime manufacturer. For similar reasons and for internal consistency, § 21.143(b) is revised to replace the term "subsidiary manufacturers" with the term "suppliers".

Proposal 8-9. No unfavorable comment was received on the proposal to amend § 21.182 to ensure that the proposed new § 45.11(c) is cross referenced. Accordingly, the proposal is adopted without substantive change.

Proposal 8-10. A commenter raises the question whether a special flight permit issued under § 21.197(a) (3) would serve as a certificate of airworthiness for international flights. The FAA notes that international flights cannot be conducted under special flight permits issued under § 21.197 unless specifically authorized by the foreign authorities concerned.

Another commenter objects to § 21.197(a) (3) (ii) because as worded, the individual aircraft would have to be flown for at least 50 hours, thereby defeating the purpose of the original proposal (as submitted for the Airworthiness Review) which aimed at eliminating unnecessary delays in obtaining FAA approval of customer demonstration flights. The commenter suggests that this provision be changed to stipulate that the aircraft type must have been flown for at least 50 hours. The FAA agrees that since the proposal concerns aircraft manufactured under a production certificate, and since the aircraft type could have been flown for at least 50 hours during the type certification program, the 50 hours of flight provision is not necessary. However, the FAA does not agree with the commenter's suggested revision. It is necessary to require that production flight tests for the individual aircraft involved be satisfactorily completed before that aircraft is flown on customer demonstration flights. Accordingly, § 21.197(a) (5) is added to prescribe this condition in place of the 50 hours of flight provision.

The same commenter also suggests that § 21.197(a) (3) (ii) should be made applicable to aircraft produced under a type certificate only, since such aircraft received close production surveillance by the FAA. The FAA agrees that a production certificate should not be the limiting factor in obtaining FAA approval of customer demonstration flights. If the aircraft has been demonstrated to otherwise meet all the safety requirements for a standard airworthiness certificate, then customer demonstration flights could be permitted. This proposal is adopted by the addition of § 21.197(a) (5).

In addition, the commenter suggests that proposed § 21.197(a) (3) (ii) be amended with a reference to the maintenance and inspection programs called for under § 21.195 for Experimental and Subpart C Provisional Type Certificates. Such procedures would unnecessarily complicate the issuance of permits for customer demonstration flights and would in effect nullify the original proposal. The portion of the proposal calling for maintenance and inspection programs in these instances is therefore withdrawn.

Proposal 8-11. No unfavorable comments were received on the proposal to amend § 23.253(b) (3) to ensure that high speed buffeting does not become severe enough to prevent the pilot from reading the instruments or controlling the airplane. Accordingly, the proposal is adopted without substantive change. Also see Proposal 8-28.

Proposal 8-12. No unfavorable comments were received on the proposal to amend § 23.361 to redefine the limit engine torque load conditions to be considered for turbine engine installations and to make other clarifying changes. Accordingly, the proposal is adopted without substantive change.

Proposal 8-13. The FAA does not agree with a commenter who suggests that the lead-in of § 23.371 be revised to make the gyroscopic load requirements applicable to piston as well as turbine engines. The FAA has no information to indicate a need for coverage of piston engines in this regulation, nor was any submitted by the commenter.

Another commenter concurs with § 23.371, assuming that a rational analysis of loads under § 23.371(a) is an alternate to the loads specified in § 23.371(b). This assumption is correct. No change to § 23.371 was proposed in this regard. Section 23.371 is adopted without substantive change.

Proposal 8-14. A commenter suggests that the word "operated" in § 23.729(c) be replaced by the word "lowered". The commenter states that the intent of the rule is to ensure that the gear can be lowered in an emergency. The FAA concurs, but the word "extended" is used to preserve the internal consistency of the section. Section 23.729(c) is revised accordingly.

This commenter also questions whether § 23.729(e) would require an "up lock". The commenter is evidently referring to a "lock" in the sense of a positive means other than hydraulic pressure, as required to keep the gear extended by § 23.729(b). Section 23.729(e) contains no such requirement.

Another commenter suggests that the second sentence of § 23.729(e) be revised to add the words "and secured" after the words "fully extended" and "fully retracted" in order to clarify what functions the lights would indicate to the pilot. The first sentence of the paragraph clearly states that the indicators should inform the pilot that the gear is secured in the extended or retracted position.

A commenter states that the proposal is redundant since the requirement is already in effect. The FAA does not agree. This is one of several new provisions being incorporated into the current regulations to assure the reliability of small land-plane landing gear systems.

After further review, the FAA has determined that the words "and warning device" should be removed from the heading of § 23.729(e) to preclude confusion between the requirements of this paragraph and those of § 23.729(f). Section 23.729 is adopted with editorial changes and the revisions discussed.

Proposal 8-15. A commenter objects to § 23.903(f) on the grounds that it imposes new and unjustified criteria for restart capability of reciprocating engine powered airplanes. The FAA believes the requirement to be fully justified. Accidents have occurred with multiengine reciprocating powered, as well as turbine powered airplanes because pilots have not been adequately apprised of the engine restart envelope for their airplane. Therefore, the requirement must apply to both types of engine installations.

This commenter further states that § 23.903(g) is acceptable provided that the "restart requirement is understood to be within the restart envelope for the aircraft (if one is approved for the aircraft)." Present § 23.903(e) (3), as applicable to turbine engine powered small airplanes, states that it must be possible to restart an engine in flight, and § 23.903(f) requires that an approved restart envelope be established. Therefore, development of a restart envelope would be required for the approval of each turbine engine powered small airplane. As adopted, § 23.903(g) requires that, following in-flight shutdown of all engines, electrical power for ignition exists throughout the approved restart envelope.

Another commenter states that it seems inconsistent to require that electrical power be provided for ignition but not for rotational capability sufficient for an engine start. The FAA does not agree. As adopted, the rule provides for those circumstances where engine windmilling speed is sufficient for restarting but insufficient to provide electrical power for ignition.

The proposal is adopted without substantive change. However, § 23.903(f) is revised to make it clear that the specified in-flight engine restart capability is required throughout the required altitude and airspeed envelope.

Proposal 8-16. No unfavorable comment was received on adding a new § 23.905(d) referencing propeller blade pitch control system durability requirements. Accordingly, § 23.905(d) is adopted without substantive change. For discussion of a related proposal to add a new § 35.42, see the discussion under Proposal 8-103.

Proposal 8-17. A commenter suggests that since the requirement for fuel tanks to retain fuel during a landing with landing gear retracted or collapsed may be subject to individual interpretation, advisory material on compliance methods should be reviewed with industry prior to implementation of the rule. The FAA does not agree. The revision merely clarifies an existing requirement. Section 23.967 is adopted without substantive change.

Proposal 8-18. A commenter recommends that the proposal to add a new § 23.991(d) which requires that operation of any fuel pump does not adversely affect continuous engine operation, be withdrawn or its adoption delayed while the compatibility of engine and airplane fuel systems is studied. The compatibility between these systems must be established in the design process, and the relevant design considerations are well known. Delaying the requirement in favor of additional study is not warranted.

Another commenter contends that the requirement is beyond the needs of safety. The FAA agrees that the proposed requirement is too restrictive and § 23.991(d) is revised to provide that the operation of any fuel pump may not affect engine operation so as to create a hazard.

Two commenters disagree with adding a new § 23.991(d), contending that it eliminates present fuel system designs. The FAA has no information to suggest that compliance with the revised section, as discussed above, would be impossible using present fuel system designs, nor was any presented by the commenter.

The proposal is adopted with the revision discussed above.

Proposal 8-19. No unfavorable comments were received on the proposal to amend § 23.1305(n) to permit movement of the propeller blade up to 8° below the flight low pitch position before an indication of the movement is required for the flight crew. Accordingly, the proposal is adopted without substantive change.

Proposal 8-20. For comments related to withdrawal of the proposal to revise § 23.1521(a), see Proposal 8-94.

Proposal 8-21. Since the proposal for § 23.1529 is substantively identical to those for §§ 25.1529 (Proposal 8-58), 27.1529 (Proposal 8-64), and 29.1529 (Proposal 8-77), all comments on these proposals are considered here.

A commenter notes that although the explanation for § 23.1529 makes it clear that the Instructions for Continued Airworthiness need not be finalized until delivery of the first airplane, the proposal itself seems to require that they be finalized before type certification. The commenter suggests that this point be clarified. The FAA agrees, and §§ 23.1529, 25.1529, 27.1529, 29.1529, 31.82, 33.4, and 35.4, are revised accordingly.

In response to a commenter representing a group of scheduled air carriers, the FAA notes that, except for the Airworthiness Limitations section, there is no requirement that any operator/owner use the Instructions for Continued Airworthiness referred to in §§ 23.1529, 25.1529, 27.1529 and 29.1529. Moreover, the new §§ 43.13(a), 43.16, and 91.163(c) allow the use of other methods. In particular, the use of maintenance manuals and continuous airworthiness maintenance programs developed under current Parts 121, 123, 127, and 135, or an inspection program approved under current § 91.217(e), would be acceptable alternatives to the Airworthiness Limitations section. This commenter suggests that language be added to § 25.1529 to make it clear that alternatives to the Instructions for Continued Airworthiness (except the Airworthiness Limitations section) may be used. This suggestion was not adopted because §§ 43.16 and 91.163(c) make this provision sufficiently clear.

Proposal 8-22, 8-23, and 8-24. Final action on Proposals 8-22, 8-23, and 8-24 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; Oct. 30, 1978).

Proposal 8-25. The proposals to add an appendix to Parts 23, 25, 27, and 29 (Proposals 8-62, 8-67, and 8-80) setting forth Instructions for Continued Airworthiness are substantively identical and are discussed below. Unless otherwise stated, the discussion refers to the designated sections in each of the appendices mentioned above.

§ *XX.1(a).* A commenter objects to the concept of specifying requirements (as opposed to providing guidance) for the preparation of Instructions for Continued Airworthiness, contending that such requirements would lead to time-consuming negotiations between the manufacturer and the FAA, and that some flexibility in providing the instructions is necessary. The appendix sets forth, in broad objective terms, the *kinds* of information the Instructions for Continued Airworthiness must contain. Within this framework, the manufacturer would be free to develop detailed instructions appropriate to its aircraft. The FAA is confident that the appendix provides a reasonable measure of flexibility, and anticipates no difficulties or delays in determining the acceptability of the Instructions developed by the manufacturer.

§ *XX.1(b).* A commenter objects to the requirement that Instructions for Continued Airworthiness be provided for appliances, contending that—(1) this information is often not available from the appliance manufacturer; (2) even when available, the information sometimes has to be revised for the particular application in a manner not approved or intended by the appliance manufacturer; and (3) the information necessary for customized equipment installations would be unreasonably costly to develop. The FAA does not agree. Such information, which is essential to the continued airworthiness of the aircraft, should be provided for each required product. Accordingly, the language of § XX.1(b) is revised to make it clear that if the aircraft manufacturer does not supply continued airworthiness instructions for the product, the Instructions for Continued Airworthiness for the aircraft must include this information. See also the discussion under § XX.3(a) (5) (i).

A commenter objects to the proposal to include information on engines and all appliances in the Instructions for Continued Airworthiness, contending that—(1) such information should be furnished by the engine or appliance manufacturer; and (2) with respect to appliances, only those for which standards have been established by FAA should be covered. On the first point, manufacturers of new engine designs are required to supply the information for their products under new § 33.4. Manufacturers of new aircraft using currently certificated engines are required by § XX.1(b) to provide the information for the engine in their Instructions for Continued Airworthiness for the aircraft. In practice, the FAA expects this information to be developed and supplied by the engine manufacturer. A similar requirement for appliances would be administratively impracticable because of the large number involved. On the second point, it should be noted that specific performance and safety standards have not been established for all essential appliances. However, upon further review, the FAA concludes that it would be unreasonable to require the aircraft manufacturer to cover appliances other than those required in applicable regulations. Accordingly, § XX.1(b), as adopted, refers only to appliances "required by this chapter."

§ *XX.2.* A commenter suggests a revision of this section to make clear that the Instructions for Continued Airworthiness may consist of a series of volumes, or may be supplied in other than book form, such as on microfilm or microfiche. The language in § XX.2 is sufficiently broad to cover these acceptable alternatives. Reference to the Air Transportation Association of America Specification No. 100 (where it appeared) is deleted from § XX.2(b) because it is nonregulatory.

§ *XX.3, lead-in paragraph.* A commenter objects to the requirement that the contents of the manual "be prepared to be understood by the persons who will be responsible for maintaining" the aircraft or product, contending that—(1) it would impose a subjective standard that would be impossible to meet; and (2) it could be interpreted to mean that, in some circumstances, manuals for aircraft to be exported must be prepared in the language of the country of export. In light of these comments, the first sentence of the lead-in paragraph of § XX.3, is revised to read as follows: "The contents of the manual or manuals must be prepared in the English language." This conveys the intent of the original proposal. A commenter points out that there may be different levels of maintenance instructions, directed at different classes of operators. For example, the maintenance instructions provided to a fleet operator or commuter airline may be more comprehensive than those provided to a fixed base operator. Any level of maintenance instructions considered appropriate by the manufacturer may be submitted, provided that those instructions comply with the minimum standards in the appendix.

§ *XX.3(a) (2).* A commenter recommends that the requirement for complete descriptions be limited in scope to the "standard" aircraft and "quantity-installed" optional equipment, contending that it would be virtually impossible to devise "custom" maintenance manuals for each product because of the many combinations of equipment that may be ordered by the purchaser. In addition, the commenter states that a manual containing all of these combinations would be difficult to use. The FAA does not agree. To achieve its purpose, the Instructions for Continued Airworthiness must contain information on each item of equipment required by regulation to be installed on the

aircraft. The FAA notes that supplemental type certificates (STC's) are required for installation of equipment not a part of the type certificate, and that this maintenance manual requirement is equally applicable to the STC applicant.

§ XX.3(a) (3). A commenter recommends that since maintenance personnel have no need for the kind of operating information provided in a Pilot's Operating Handbook, the paragraph be revised to require only *basic* principles of equipment control and operation. The FAA agrees, and § XX.3(a) (3) now refers to "basic control and operation information."

§ XX.3(a) (5) (i). A commenter recommends that applicants be allowed to refer to a component manufacturer as a source of information instead of including the information in the Instructions for Continued Airworthiness. The commenter argues that many component manufacturers prefer to maintain control of their maintenance information to ensure that it is up to date. In other cases, maintenance at the factory may be required because of the complexity of the equipment. The FAA recognizes that some accessories, instruments, and equipment have an exceptionally high degree of complexity, requiring specialized maintenance techniques, test equipment, or expertise. In such cases, it would be in the interest of safety to allow the applicant to refer to the appropriate manufacturer in the maintenance instructions. The FAA does not agree, however, that such reference should be allowed in other circumstances. Section XX.3(a) (5) (i) (redesignated § XX.3(b) (1)) is revised accordingly.

A commenter recommends that the last sentence of § XX.3(a) (5) (i), be revised to allow reference to a separate inspection program, rather than include it in the maintenance instructions, so that the inspection program could be better kept current and also tailored to an individual operator's needs. The FAA does not agree. The inspection program must be set forth in the Instructions for Continued Airworthiness to ensure its availability to those who will benefit from it.

The FAA, after further study of § XX.3(a) (5) (i), has decided that the provision should specifically require a description of applicable maintenance or wear tolerances. Section XX.3(a) (5) (i) (redesignated § XX.3(b) (1)) is clarified in this regard.

§ XX.3(a) (5) (ii). A commenter objects to the words "could occur" in this paragraph because it encompasses everything within the realm of possibility, thereby unnecessarily increasing the volume of the maintenance instructions. The phrase "probable malfunctions" replaces the phrase "typical malfunctions that could occur" in § XX.3(a) (5) (ii) (redesignated § XX.3(b) (2)).

§ XX.3(a) (5) (iii). A commenter suggests that this paragraph would be clearer if the first three words and the last five words are deleted. Section XX.3(a) (5) (iii) (redesignated § XX.3(b) (3)) is revised accordingly.

§ XX.3(a) (5) (iv). A commenter suggests revision of this paragraph to make it clear that the overweight landing check refers to the condition in which a certificated landing weight is lower than certificated takeoff weight, since the aircraft manufacturer cannot speculate what damage might be done to an aircraft that takes off and must immediately land at a weight near the certificated takeoff weight. This comment may have merit for certain aircraft. Moreover, since an overweight landing is but one of several occurrences which would necessitate a check to determine aircraft damage, to single out one occurrence would imply that the others need not be covered in the maintenance instructions. Accordingly, the words "checks after an overweight landing" are deleted from § XX.3(a) (5) (iv) (redesignated § XX.3(b) (4)).

§ XX.3(b). A commenter recommends deletion of the requirement for an overhaul manual or section, contending that—(1) there are many products that, for safety reasons, should not to be overhauled; and (2) the manufacturer must make the technical assessment as to whether a product can be safely overhauled. In the light of these comments, and after further consideration, the FAA finds that those portions of § XX.3(b) that provide for overhaul information only (except for engines), should not be required in the Instructions for Continued Airworthiness. Accordingly, §§ XX.3(b) (1) (i), XX.3(b) (1) (ii),

XX.3(b) (1) (iv), XX.3(b) (1) (viii), and XX.3(b) (3), are withdrawn. The other provisions of § XX.3(b) specify information that is needed for purposes other than overhaul.

§ XX.3(b) (1) (iii). No adverse comment was received on this proposal to require structural access plate information. Accordingly, it is adopted as proposed, but redesignated § XX.3(c).

§ XX.3(b) (1) (v). No adverse comment was received on this proposal to require instructions on special inspection techniques. Accordingly, it is adopted as proposed, but redesignated § XX.3(d).

§ XX.3(b) (1) (vi). A commenter points out that no part can be restored to its original condition by protective coatings or treatments. The FAA agrees, and § XX.3(b) (1) (vi) (redesignated § XX.3(e)) is revised to make this clear and to require only the information necessary to apply protective treatments to the structure after inspection.

§ XX.3(b) (1) (vii). No adverse comment was received on this proposal to require data on structural fasteners. Accordingly, it is adopted as proposed, but redesignated § XX.3(f).

§ XX.3(b) (1) (ix). No adverse comment was received on the proposal to require a list of special tools. Accordingly, it is adopted as proposed, but redesignated § XX.3(g).

§ XX.3(c). Three commenters object to the concept of supplying generalized repair data. One contended that—(1) the nature of the damage may not be known in a particular case, though it may appear to fall under a general repair "fix"; (2) the safety of the product may be seriously impaired by repairs made in such instances; and (3) the manufacturer can provide alternate means for a mechanic to obtain repair data. In the light of these comments, the FAA agrees that it is not necessary to include the repair information in the Instructions for Continued Airworthiness as proposed. Accordingly, proposed § XX.3(c) is withdrawn.

§ XX.4. A commenter suggests that the manufacturer should be allowed to list items in the Airworthiness Limitations section that it deems necessary to maintain structural integrity, where such items are not called out in the applicable airworthiness standards. Another commenter, representing the scheduled airlines, objects to the inclusion, in the Airworthiness Limitations section, of mandatory replacement times for parts other than life-limited parts and of mandatory inspection intervals. The resolution of these comments is discussed under Proposal 8–3. The language proposed for the Airworthiness Limitations sections of the appendices to Parts 23, 25, 27, and 29 is being retained, except that the mandatory replacement times, mandatory inspection intervals, and related procedures are specified as those associated with structural integrity—including those approved under current § XX.571. It also is made clear that FAA approved alternative programs may be used. To avoid unnecessary restriction being placed on operation, only these items are listed in the pertinent Airworthiness Limitations section. Other items can of course be listed in other sections of the Instructions for Continued Airworthiness.

Proposal 8–26. The addition of new §§ 25.101(i) and (j) would set forth requirements for automatic systems that affect performance, including automatic takeoff thrust control systems (ATTCS). In view of the evolving technology of automatic systems, the special features and functions of each design, and the complex interrelationships with other systems, the FAA has concluded that specific regulations are premature and that safety considerations can be more advantageously addressed in special conditions for specific systems. Accordingly, Proposal 8–26 and related Proposals 8–34, 8–48, and the § 25.1305(c) (9) portion of 8–50 are withdrawn.

Proposal 8–27. The revision of § 25.111(c) (4) will permit changes in power or thrust by an automatic takeoff thrust system but prohibit any change requiring action by the pilot when determining the takeoff path. Although specific proposals relating to criteria for automatic takeoff thrust systems have been withdrawn, the FAA believes that this proposal should be retained as it standardizes the procedure for determining the takeoff path, and is consistent with current practice.

One commenter implies that this rule change will add the task of monitoring conditions and instruments and thereby increase the pilot workload. Other commenters suggest that a limited provision for manual throttle setting be included, or are opposed to the proposal completely on the grounds that safety will be compromised in service. Since the rule will apply in the context of a determination of performance rather than an operating requirement, the proposal is adopted without change.

Proposal 8-28. A commenter suggests that the term "impair" in § 25.253(a) (2) (iii) be changed to "significantly impair". The FAA does not agree. In present high altitude, high Mach number jet airplanes, any recovery from upset or speed anomaly must be done essentially by reference to flight instruments. Therefore, any buffet or vibration condition which would in any way impair the pilot's ability to accurately interpret instrument information cannot be tolerated. The same commenter stated that some interpretative material on vibrational frequencies and levels of acceleration would be useful. Use of interpretative material would divert attention from the primary consideration, impairment of pilot ability, which is qualitative. Proposed § 25.253(a) (2) (iii) is adopted without substantive change.

Proposal 7-17. Although no unfavorable comment was received on the proposal to amend § 25.305(d), two commenters state that their agreement was with the understanding that both the discrete gust and the continuous turbulence analyses are required. Present § 25.341(a) requires that limit load factors be established by reference to a discrete gust encounter. Present § 25.305(d) specifies that the dynamic response of the airplane to vertical and lateral continuous turbulence must be taken into account. Both analyses are required.

Two commenters recommend that present § 25.341 be amended to require dynamic loads analysis by reference to discrete gusts having varying gust gradient distances. The FAA does not agree. The combination of discrete gust analysis under § 25.341 and continuous turbulence analysis under § 25.305 is less complex than the method described by these commenters and provides sufficient substantiation of strength. The proposal is adopted without substantive changes.

Proposal 8-29. Many negative comments were received on the proposal to revise § 25.307(a) to require ultimate load tests for each normal and fail-safe critical load condition. Three commenters indicate that the proposed regulation would add to the cost and time required for certification although present airplane safety records do not support the need for a change. One commenter points out that the design philosophy used for commercial transports, due to the dominant influence of the economic requirement for long life without structural fatigue problems, often produces reserve margins of safety. Another commenter proposes that ultimate load tests be limited to structures such as composites, which substantially differ from conventional structure. The FAA agrees that to conduct ultimate load tests for all critical load conditions would greatly increase the amount of testing required, which is not warranted by the safety record since there have been no service features which indicate that present methods of substantiation are inadequate. In many cases failures in service result from conditions such as fatigue or corrosion which are not covered by ultimate load tests. The proposal to require ultimate testing of all structural components therefore is deleted. In some cases, however, analysis must be supplemented by limit and/or ultimate load tests. The amendment, as adopted, is revised accordingly.

Proposal 8-30. Several negative comments were received on §§ 25.365(e) and (f), requiring airplane designers to consider pressure vessel decompression resulting from the loss of any nonplug door, detonation of a bomb within the cabin at all probable locations, and engine disintegration. Several commenters oppose designing for the loss of a nonplug door, stating that there is no reason why nonplug doors cannot be designed to be as safe as plug doors. These commenters suggest that the door design criteria be upgraded to improve door integrity. The FAA agrees that door integrity should be improved to the extent that design for their loss is not justified. Therefore § 25.783 is revised in response to Proposal 8-35 to require this improved level and § 25.365(e) (1) is withdrawn.

Many commenters object to designing for all possible bomb detonations and probable bomb locations. A commenter points out that airworthiness requirements in the past have attempted to safeguard aircraft against structural and mechanical failure, human error, natural hazards, etc. They note that no one has attempted to incorporate into airworthiness requirements the consequences of homicidal or suicidal tendencies. Another commenter states that the aircraft industry has to accept responsibility for compensating the public for loss or injuries resulting from defects in its products, and the inclusion of a bomb damage requirement in Part 25 could significantly extend the grounds of possible product liability actions, particularly with the imprecise requirements of § 25.365(e). Many commenters state that the wording of § 25.365(e) (3) is so vague as to make its implementation impossible. The FAA notes that, ultimately, minimizing the loss of airplanes as a result of bomb explosions is a ground security problem.

A commenter suggests an alternative to § 25.365(e) (3) which would establish a relationship between the design maximum opening and the cross-sectional area of the pressurized shell. The FAA agrees that the proposed relationship provides an acceptable method for determining hole size. The FAA has determined that the maximum hole size required should be 20 square feet, a value contained in Airworthiness Directive 75–15–05 (August 11, 1975) pertaining to openings in wide-body transports. Section 25.365(e) (3) is revised to allow the maximum opening to vary as a function of the cross-sectional area of the pressurized shell to account for the differences in size between narrow and wide-body transports and is redesignated and adopted as § 25.365(e) (2).

The FAA finds that the maximum opening specified in adopted § 25.365(e) (2) will exceed the opening that would result from causes other than bomb explosions or engine disintegration, and that a probability safety analysis to determine hole size in passenger or cargo areas resulting from other causes is not needed. Thus, proposed § 25.365(f) is withdrawn.

In light of the comments received on proposed § 25.365(e) (4), and after further consideration, the FAA concludes that openings caused by airplane or equipment failure can occur in any compartment, and that partitions, bulkheads, and floors should be designed for openings from these causes. Thus, proposed § 25.365(e) (4) is revised accordingly, redesignated, and adopted as § 25.365(e) (3).

No adverse comments were received on proposed § 25.365(e) (2) to require design to withstand penetration of the cabin by a portion of an engine following engine disintegration and the proposal is redesignated § 25.365(e) (1) and adopted without substantive change.

Amendment to § 25.571(a) (3). Because of the change to § 25.1529 adopted in this amendment, the reference to the "maintenance manual" in § 25.571(a) (3) is no longer appropriate. For consistency, § 25.571(a) (3) references the Airworthiness Limitations section of the Instructions for Continued Airworthiness.

Proposal 8–31. Numerous unfavorable comments were received on the proposal to add a new § 25.633 requiring that essential systems be designed to minimize damage caused by detonation of a bomb in the airplane. Most commenters contend that there is no means to protect essential systems from all possible bomb detonations and that bomb size and location cannot be rationally defined. Several commenters indicate that the separation of essential systems on modern airplanes presently provides a measure of protection and that the proposed requirements of § 25.633 are beyond the state of the art.

The FAA agrees that a rational means of determining and defining all possible bomb size/location combinations which would damage essential systems does not exist. Therefore, the proposal is withdrawn.

Proposal 8–32. Several commenters object to the proposed horizontal stabilizer "trim-in-motion" aural warning requirement of § 25.677(e) on the grounds that the aural environment in today's cockpits is already cluttered and that finding new and distinctive aural warnings is becoming difficult. They further suggest that small increments of trim change should not cause aural warning, and that warnings should be given only when a

safety-of-flight hazard exists. One commenter suggests that there is no need for separate aural warning on aircraft having direct trim control wheels in the cockpit.

The FAA agrees with the comments and upon further review concludes that the proposal is premature and unworkable. Accordingly, it is withdrawn for further study.

Proposal 8-33. Several adverse and supporting comments were received on the proposal to add a new § 25.685(e) requiring arrangement of control systems to provide an airplane with the capability of continued safe flight and landing in the event of an inflight localized structural failure. Several commenters agree with the intent of the proposal and propose minor changes. One commenter agrees with the intent of the proposal, but believes that only failures which have not been shown to be extremely improbable need be considered. Commenters state that the intent of the proposed rule change is already encompassed by § 25.365(e) which would require that floor failure resulting from rapid decompression be shown to be extremely improbable.

A commenter further states that present § 25.671(c) requires control systems to be designed to be tolerant of failures, and that control system damage is more likely from other sources. The commenter claims that service experience and rational analysis show that the floor structure provides the best available protection for the control system from damage from these other sources.

After further study the FAA agrees with the commenters that the primary objectives of this proposal are adequately covered by several existing sections of FAR 25. For example: § 25.365(e) requires that the floor be designed for pressure vessel opening which is a function of the cross-sectional area of the fuselage; § 25.571 requires all structure to be damage tolerant where practical; § 25.671 requires that control systems be tolerant of failures, including exterior damage; § 25.629 requires freedom from flutter under failure conditions; § 25.631 requires protection of controls in the empennage structure from bird strikes; and § 25.901(d) requires design precautions be taken to minimize the hazards to the airplane, including control systems, in the event of an engine rotor failure. The proposal therefore is withdrawn.

Proposal 8-34. For an explanation of the withdrawal of the proposals concerning automatic systems that affect airplane performance, one of which is the proposal to add a new § 25.705, see Proposal 8-26.

Proposal 8-35 and 2-59. Several commenters object to the requirement in § 25.783(e) that provisions for the inspection of door locking mechanisms must be discernable under all possible lighting conditions. The commenters state that allowance should be made for use of supplemental lighting such as a flashlight to aid in the inspection. The FAA agrees and the section is revised accordingly.

A commenter states that direct visual inspection is only needed for external doors for which the initial opening movement is not inward and which are pressurized or for which an inadvertent opening could prevent continued safe flight and landing. Although these comments have merit, they go beyond the scope of Proposal 8-35 and interested parties have not had an opportunity to comment on these changes. No change to the section is being made based on these comments. Several commenters object to the redundancy of a dual warning system requirement and state that in lieu of redundancy, a reliability level should be specified. Further comments state that all external doors do not require this level of reliability. The FAA agrees that this reliability level could be specified and should apply only to external doors for which initial movement is not inward, and the section is changed accordingly. The present language defining where door warning systems are required is retained, as no change in present practice is intended.

A commenter suggests that § 25.783(e) should specify several good design practices. These design practices are desirable but are not essential, since the necessary level of safety can be obtained by alternate means under § 25.783.

Several commenters object to new § 25.783(f), suggesting that it apply only to nonplug type doors and doors whose loss would present a probable hazard. The FAA agrees that provisions to prevent unsafe pressurization can be limited to doors whose loss would

present a probable hazard. However, the FAA does not agree that it should be limited to nonplug type doors because a plug door is defined as one whose initial opening is inward and this feature does not necessarily provide complete assurance that an unsafe pressurization will not occur with subsequent opening of the door in flight. The clarifying phrase "to an unsafe level" has been added to § 25.783(f). The intent is to prevent pressurization to a level which would be hazardous if an unlocked external door inadvertently opened.

Several commenters object to proposed new § 25.783(g) (Proposal 8–35), stating that it would unnecessarily preclude the use of nonplug type doors above 45,000 ft. The FAA agrees that nonplug type doors can safely be used at altitudes above 45,000 ft., since adequate warning systems and door integrity are provided by § 25.783(e). Proposed new § 25.783(g) is withdrawn.

A commenter proposes that for the door whose opening would be a hazard, the door and immediate surrounding fuselage, door mechanisms, and warning system be designed for any combination of failures (including improper operation) not shown to be extremely improbable. The FAA agrees. In place of the proposals in 8–30, with regard to §§ 25.365(e) (1), (3), and (4), a rule is included to require determination by safety analysis that inadvertent opening of doors which could prevent continued safe flight and landing is extremely improbable.

Two commenters state that the criteria for passenger egress in the revision to the second sentence of § 25.783(g) (Proposal 2–59 of Notice 75–10) should be evacuation time, and not the rate of passenger egress through a given exit. The FAA agrees. Revision of the second sentence of § 25.783(g) is redesignated as § 25.783(i) and the reference to § 25.561(a) (3) in the proposal is corrected to reference § 25.561(b) (3).

Numerous negative comments concern proposed new § 25.783(j), which requires that lavatory doors open into the cabin to preclude anyone from being trapped in the lavatory. The commenters state that this requirement is overly restrictive on design and that an outward opening door could have an adverse effect on aisle width and emergency evacuation capabilities if such a door jammed open. The FAA agrees that inward opening doors can be designed to prevent anyone being trapped in a lavatory in cases of incapacitation or for other reasons. Thus, new § 25.783(j) is revised to delete the requirement that lavatory doors open into the cabin.

Proposals 8–36, 2–60, and 8–37. Final action on Proposals 8–36, 2–60, and 8–37 was taken in Airworthiness Review Program, Amendment No. 8: Cabin Safety and Flight Attendant Amendments (45 FR 7750; February 4, 1980).

Proposal 8–38. One commenter objects to adding a new § 25.792 to require a sign indicating whether lavatories are occupied, asserting that it would be inappropriate for general aircraft certificated under Part 25. Two commenters doubt that the proposed rule would achieve the objective of preventing aisle congestion near lavatories. They point out that many existing aircraft have similar signs which have not prevented people from "standing in line" for lavatories. Also, passengers can cause congestion in aisles for other reasons. One of the commenters states that lighted signs in a darkened cabin; i.e., during movies or rest periods, would annoy passengers, and that the rule might foster a proliferation of signs throughout the cabin. Finally, one commenter is concerned that any increase in the number of lighted signs might distract the passengers' attention from more essential notices.

Based on the comments and upon further review, the FAA finds that the proposed requirement would not achieve the objective sought. Accordingly, the proposal is withdrawn.

Proposal 8–39. Final action on Proposal 8–39 was taken in Airworthiness Review Program Amendment No. 8: Cabin Safety and Flight Attendant Amendments (45 FR 7750; February 4, 1980).

Proposal 8–40. Final action on Proposal 8–40 was taken in Operations Review Program Amendment No. 8 (45 FR 41586, June 19, 1980).

Proposal 8–41. A commenter suggests that new § 25.851(a) (5), which replaces current § 25.853(f), be expanded to prescribe four fire extinguishers for a passenger capacity of 100 or more, and to require at least one CO_2, dry chemical, or all purpose fire extinguisher near lavatory and galley areas. These suggested changes are beyond the scope of the notice. However, changes in these requirements are appropriate and the FAA is conducting a research program to establish comprehensive standards and guidance information pertaining to the selection of portable fire extinguishers, taking into consideration types and quantities of extinguisher agents, extinguisher performance, and other factors. Regulatory changes based on the findings of this research program will be proposed in the next airworthiness standards review.

Sections 25.851(a) (5) and (a) (6), which consolidate hand fire extinguisher requirements, are adopted without substantive change.

Proposals 8–42, 2–18, 2–65, 2–114, and 2–160. Final action on Proposals 8–42, 2–18, 2–65, 2–114, and 2–160 was taken in Airworthiness Review Program, Amendment No. 8: Cabin Safety and Flight Attendant Amendments (45 FR 7750; February 4, 1980).

Proposal 8–43. Final action on Proposal 8–43 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

Proposal 8–44. For a discussion of proposed § 25.905(c), see the discussion under Proposal 8–103. The proposal to add a new § 25.905(c) is adopted without substantive change.

Proposals 8–45 and 8–96. The proposed amendments to §§ 25.939 and 33.65 are being deferred for consideration in a forthcoming notice of proposed rule making of the Aircraft Engine Regulatory Review Program.

Proposals 8–46, 3–35, and 8–47. Final action on Proposals 8–46, 3–35, and 8–47 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; Oct. 30, 1978).

Proposal 8–48. For an explanation of the withdrawal of the proposals concerning automatic takeoff thrust control systems, one of which is the proposal to add a new § 25.1143(f), see Proposal 8–26.

Proposals 8–49 and 3–41. Final action on Proposals 8–49 and 3–41 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; Oct. 30, 1978).

Proposal 8–50. For an explanation of withdrawal of the proposals concerning automatic takeoff thrust control systems, one of which is the addition of a new § 25.1305(c) (9), see Proposal 8–26.

One commenter objects to revising § 25.1305(d) (1), stating that significant aerodynamic forces acting on the powerplant nacelle make the direct measurement of thrust impractical. The FAA agrees that such forces may be significant. This commenter further objects to the revision, stating that it is beyond the state of the art to prohibit a parameter from being used if the accuracy of the indication will be adversely affected by any engine malfunction or damage. The FAA agrees that precise values of thrust provided by a malfunctioning, damaged, or deteriorated engine are unnecessary, provided that any changes in thrust due to engine malfunction, damage, or deterioration are indicated to the pilot. The paragraph is revised to require that the indication must be based on the direct measurement of thrust or of parameters that are directly related to thrust.

Although concurring with § 25.1305(d) (1), one commenter states that he would prefer to retain the existing requirements and delete the words ",or to indicate a gas stream pressure that can be related to thrust,". The FAA does not agree. The change suggested by this commenter would eliminate the requirement for thrust information and would retain the requirement for change-of-thrust information only. It also would provide a lower level of safety than the adopted paragraph.

This commenter also states that § 25.1305(d) (1) should be complementary to a similar requirement in Part 33 of this chapter. The FAA does not agree. In current practice, the airframe manufacturer determines how performance should be met. The choice of a

means to indicate thrust is negotiated between the airplane manufacturer and the engine manufacturer. The factors which influence the final choice are substantial and may vary among airplane designs. These factors may not be known to the engine manufacturer at the time of engine type certification. Another commenter states that the need for an actual value of thrust is not obvious, whereas indication of a loss of thrust would satisfy the original proposal. The FAA agrees that the actual value of thrust is of little value to the pilot. Section 25.1305(d) (1) is revised to specify that the indicator indicate thrust, or a parameter related to thrust, to the pilot.

Proposal 8-51. No unfavorable comments were received on the proposal to change the reference in § 25.1307(h) for fire extinguishers in connection with Proposal 8-41. Accordingly, the proposal is adopted without substantive change.

Proposal 8-52. Final action on Proposal 8-52 was taken in Airworthiness Review Program, Amendment No. 8: Cabin Safety and Flight Attendant Amendments (45 FR 7750; February 4, 1980).

Proposal 8-53. Several commenters point out a number of service deficiencies with proposed § 25.1421 which defines the requirements for cargo compartment fire detection systems. They contend that the requirement for the detection system to actuate a warning within one minute of the start of a fire is too restrictive. One commenter cites the results of FAA tests which show average fire detection times to be from 1.75 to 5 minutes. The commenters also suggest that the tests necessary to show compliance with the warning requirements are not clearly defined. Finally, one commenter points out that fires in baggage containers and other enclosed containers can burn for a considerable time before detection is likely by fire detectors in the cargo compartment.

The FAA does not concur that the one-minute requirement is too restrictive. A survey of fire detection technology has indicated that the state of the art permits detection of a fire in less than one minute after inception. In addition, current standards do not define the test procedures necessary to show compliance with warning requirements. The new one-minute requirement is intended to improve the standards in this regard.

The proposal is adopted without substantive change.

NOTE: This proposal has been carried erroneously under § 25.1421 which pertains to megaphones. It will be included in the amendment as a new § 25.858.

Proposal 8-54. Comments received from several commenters reflected confusion over the intent of proposed § 25.1439(c). It was noted that much of what was intended by proposed § 25.1439(c) is included in existing § 25.1439(a) as amended by Amendment 25-38 (41 FR 55454; 12/20/76), provided that the portable oxygen requirements of § 25.1447(c) (4) are retained. Amendment 25-38 emanated from Airworthiness Review Program Notice No. 2 (40 FR 10813; 3/7/75), and was adopted (41 FR 55468; 12/20/76) after publication of Airworthiness Review Program Notice No. 8 (40 FR 29420; 7/11/75) which contained proposals 8-54 and 8-55. The FAA agrees that the existing regulations require much of what was intended by proposal 8-54, provided that proposal 8-55 is withdrawn. The FAA further agrees that additional clarifications are needed before further amendments are made to § 25.1439. Therefore the FAA withdraws both proposals 8-54 and 8-55. The subject of protective breathing equipment will be addressed in a forthcoming notice of proposed rule making.

Proposal 8-55. The proposal to delete § 25.1447(c) (4) is withdrawn for the reasons stated for withdrawal of Proposal 8-54.

Proposal 8-56. For comments related to the proposal to revise § 25.1521(a), and for the withdrawal of that proposal, see Proposal 8-94.

Proposal 8-57. Final action on Proposal 8-57 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

Proposal 8-58. For comments related to the proposal to amend § 25.1529, see Proposal 8-21.

Proposal 8-59. A commenter objects to the proposed new § 25.1557(e), calling for a placard on each flight attendant seat to indicate that it may be occupied by a flight

attendant, asserting that such placarding is redundant and that a proliferation of placards in the aircraft will only serve to confuse the passengers and make all placards less effective. The commenter also states that the proposal would prohibit non-flight attendant airline personnel who are cognizant of emergency procedures from occupying flight attendant seats when the aircraft is full. The FAA concludes that a new aircraft certification rule is unnecessary to achieve this result and the proposal is withdrawn.

Proposals 8-60 and 8-61. Final action on Proposals 8-60 and 8-61 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

Proposal 7-55. A commenter recommends that discrete gusts with varying gradient distances be added as a supplement to Appendix G to Part 25. The FAA disagrees because past experience with the use of discrete gusts with varying gust gradient distances has indicated that knowledge with regard to how gust intensity varies with gust gradient distance is not currently available to the designer. The research and development work accomplished in the area of dynamic response to continuous turbulence has indicated that the continuous turbulence criteria of Appendix G to Part 25 is the most rational approach currently available which gives consistent strength levels for airplanes of different characteristics and missions.

A commenter recommends that paragraph (a) of Appendix G be revised to delete the requirement for considering combined stresses based on both vertical and lateral components of turbulence. The commenter states that the current practice of combining root-mean-square stresses (shear, moment, and torsion) resulting from gust calculations involving only purely vertical or lateral components of turbulence is a realistic, practical method for combining stress. The commenter contends that the methods for realistically combining statistical load quantities involving both vertical and lateral components of turbulence have not been satisfactorily developed in the current state of the art. After further review the FAA agrees. Paragraph (a) of Appendix G is revised to delete the requirement for considering the combined stresses resulting from the vertical and lateral components of turbulence.

A commenter recommends that paragraph (b)(3)(i) of Appendix G be revised to require a gust intensity of $U\sigma = 75$ fps gust velocity in the interval 0 to 20,000 ft. altitude with a linear decrease to 30 fps at 80,000 ft. altitude. This recommendation would obviate the need to do mission analysis to justify lower levels of loads than those required to meet the design envelope gust intensity factor of 85 fps for new airplanes whose characteristics are similar to previous designs which have been shown to be adequate for the lower level of gust intensity being proposed. There is no technical need for new aircraft which are similar to existing aircraft with regard to response characteristics and basic mission profiles to make extensive mission analysis computations in order to establish their adequacy with regard to loads resulting from encounters with continuous turbulence if they are designed for the gust intensity shown to be adequate for the existing design. Therefore, it is acceptable to use a gust intensity value of 75 fps from 0 to 20,000 ft. altitude, and a linear reduction from 75 fps at 20,000 ft. to 30 fps at 80,000 ft., provided the new design is comparable to a similar design with extensive satisfactory service experience. These criteria, which have been under discussion between FAA and industry for over 10 years, are proposed as new rules rather than acceptable means of complying with existing rules. Paragraph (b)(3)(i) is revised accordingly. The commenter also recommends that paragraph (d)(1) be revised to require a gust intensity of $U\sigma = 60$ fps on the interval 0 to 20,000 ft. altitude and be linearly decreased to 23 fps at 80,000 ft. altitude. The FAA disagrees. The gust intensities in paragraph (d)(1) are based on the distribution of gust intensity with altitude which were developed in the basic research for the development of continuous turbulence criteria and are, therefore, considered reasonable as a lower design envelope limit for mission analysis. A cost analysis was provided by the commenter to justify the lower gust intensities, but the FAA finds that this cost analysis was based on "design envelope analysis" alone. Paragraph (c), which is an alternative to paragraph (b), provides for a "mission analysis". Actual experience has

shown that "mission analysis," which considers airplane operational characteristics, has been used in the past in lieu of the 85 fps intensities to prevent weight and cost penalties. Paragraphs (c) and (d) of Appendix G are adopted without substantive change.

A commenter recommends that paragraph (d) of Appendix G be revised to delete the reference to "fail-safe loads" since such loads are not provided in Appendix G. The FAA agrees. Paragraph (d) of Appendix G is revised accordingly.

A commenter recommends that proposed paragraph (e) of Appendix G be deleted since acceleration levels measured at the pilot station on current conventional aircraft can be established by flight demonstration much more easily and with less cost than by use of an expensive analysis considering response to continuous turbulence. Upon further review, the FAA has determined that it lacks sufficient information to specify the right combination of analysis and flight test to determine the acceleration levels at the pilot's station during continuous turbulence. Accordingly, proposed paragraph (e) of Appendix G is withdrawn. The current requirements related to operation in turbulence are adequate to determine the response at the pilot's station during continuous turbulence.

Proposal 8–62. For comments related to the proposal to add a new Appendix G to Part 25, see Proposal 8–25. Appendix G (redesignated Appendix H) to Part 25 is adopted with the changes discussed in Proposal 8–25.

Proposal 8–63. Final action on Proposal 8–63 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

Amendment to § 27.571. Because of the change to § 25.1529 adopted in this amendment, the reference to § 27.1529(a) (2) in §§ 27.571(b), (c), (d) (1), (d) (3), and (e) is no longer appropriate. The reference is changed to "§ A27.4 of Appendix A". This discrepancy was overlooked in Notice 75–31 (40 FR 29410; July 11, 1975). Since this amendment is clarifying in nature and does not impose a burden on the public, notice and public procedure are unnecessary and good cause exists for adopting this amendment.

Proposal 8–64. For comments related to the proposal to amend § 27.1529, see Proposal 8–21.

Proposals 8–65 and 8–66. Final action on Proposals 8–65 and 8–66 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

Proposal 8–67. For comments related to the proposal to add a new Appendix A to Part 27, see Proposal 8–25. Additional comments on this proposal, and on the proposal to add a new Appendix A to Part 29, are discussed here.

A commenter suggests that the wording of Appendix A be adjusted to take into account the differences between airplanes and rotorcraft. The FAA agrees. The appendix, as proposed, is generally equally applicable to airplanes and rotorcraft. However, several minor changes have been made to the appendix to provide for rotorcraft differences, primarily to cover rotors and differing fatigue standards.

A commenter objects to Appendix A, contending that: (1) The standards in current §§ 27.1529 and 29.1529 have been adequate in service, and (2) the proposal is excessive in scope and would create an undue burden. The FAA does not agree, having found that recommended maintenance procedures made available to operators/owners in the past were frequently inadequate in scope and content, providing no sound basis for maintaining the airworthiness of the rotorcraft. Appendix A, with the revisions and deletions discussed above and under Proposal 8–25, would not create an undue burden on the type certificate applicant.

One commenter expresses concern that certain inspection provisions in current § 91.217 might be applied to rotorcraft. The appendix contains no such requirement. Current § 91.217 applies only to certain airplanes.

Amendment to § 29.571. Because of the change to § 29.1529 adopted in this amendment, the reference to "§ 29.1529(a) (2)" in §§ 29.571(b), (c), (d) (1), (d) (3), and (e) is no longer appropriate. For consistency, the reference is changed to "§ A29.4 of Appendix A required by § 29.1529". This change was overlooked in Notice 75–31 (40 FR 29410; July

11, 1975). Since this amendment is clarifying in nature and does not impose a burden on the public, notice and public procedure are unnecessary and good cause exists for adopting this amendment.

Proposal 2-154. For a discussion directly related to proposed new § 29.783(g), see the discussion under Proposal 8-35 for § 25.783(g) (Proposal 2-59 of Notice 75-10). Section 29.783(g) is adopted without substantive change.

Proposals 8-68 through 8-76 and 2-164. Final action on Proposals 8-68, 8-69, 8-70, 8-71, 8-72, 8-73, 8-74, 8-75, 8-76, and 2-164 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

Proposal 8-77. For comments related to the proposal to amend § 29.1529, see Proposal 8-21.

Proposals 8-78 and 8-79. Final action on Proposals 8-78 and 8-79 was taken in Airworthiness Review Program, Amendment No. 7: Airframe Amendments (43 FR 50578; October 30, 1978).

Proposal 8-80. For comments related to the proposal to add a new Appendix A to Part 29, see Proposals 8-25 and 8-67.

Proposal 8-81. No unfavorable comments were received on adding a new § 31.12 providing for standardized application of the airworthiness requirements for balloons. Accordingly § 31.12 is adopted without substantive change.

Proposal 8-82. No unfavorable comments were received on adding a new § 31.16 requiring that balloon empty weight be determined. Accordingly, § 31.16 is adopted without substantive change.

Proposal 8-83. No unfavorable comments were received on the intent of new § 31.17 which specifies performance in terms of an initial minimum rate of climb. However, a commenter raises the question whether compliance with proposed § 31.17(a) could be shown by testing at several altitudes and ambient temperatures and then extrapolating, by appropriate analysis, to the other values in the range for which approval is sought. The FAA considers that such extrapolation by analysis is an acceptable means of complying with proposed § 31.17(a), because the climb performance of balloons is based on fundamental principles and, therefore, can be predicted with sufficient accuracy from established test points.

The FAA notes that the 300 fpm climb rate requirement in § 31.17(a) was intended as a minimum standard. To make this clear, § 31.17 as adopted is revised by inserting the words "at least" before the number "300" in the first sentence of § 31.17(a).

Proposal 8-84. A commenter, referring to new § 31.19(a) governing critical uncontrolled descent, suggests that it would be difficult and time-consuming to determine which tear is the most critical single tear in the balloon envelope between tear stoppers. The FAA does not agree. An analysis, or a combination of test and analysis, would be an acceptable means of determining the most critical single tear. It would not be necessary to test each kind of tear. No other unfavorable comments were received on the proposal to add a new § 31.19. Accordingly, § 31.19 is adopted without substantive change.

Proposal 8-85. No unfavorable comments were received on the proposal to amend § 31.27(c) to be consistent with new § 31.19, Performance: Uncontrolled descent. Accordingly, the proposal is adopted without substantive change.

Proposal 8-86. No unfavorable comments were received on the proposal to amend § 31.65 updating the position light standards and expressing them in language consistent with related standards in other airworthiness parts. However, the FAA finds that the use of a cross reference to § 23.1397 as proposed in § 31.65(e) may be inconvenient for those governed by Part 31. Accordingly, § 31.65, as adopted, sets forth the chromaticity coordinates for aviation red and aviation white as currently prescribed in § 23.1397.

Proposal 8-87. No unfavorable comments were received on the proposal to amend § 31.71. However, after further consideration, the FAA concludes that proposed § 31.71(a)(2) is unnecessarily restrictive in that it would, in all cases, require marking the

equipment as to its identification, function, *and* operating limitations. Marking of the equipment as to its identification, function, *or* operating limitations, or any applicable combination of those factors is sufficient. This is also the language used in corresponding sections of other aircraft airworthiness regulations. Section 31.71, as adopted, is revised accordingly.

Proposal 8–88. No unfavorable comments were received on the proposal to amend § 31.81 to detail operating limitations and information. The FAA notes, however, that proposed § 31.81(b) is not clear as to which "operating limitations and other information necessary for safe operation" must be furnished. The FAA's intent, as stated in the explanation, is to require that the information established under § 31.81(a) be furnished. Section 31.81(b) is revised accordingly. Section 31.81(a) is adopted without substantive change.

Proposal 8–89. A commenter is concerned that proposed § 31.82 might require balloon manufacturers to prepare two overlapping maintenance documents—the maintenance manual currently supplied to operators/owners, and the proposed Instructions for Continued Airworthiness. The FAA notes that under §§ 31.82 and 21.50(b), balloon manufacturers would be required to prepare and furnish only the Instructions for Continued Airworthiness.

The FAA notes further (as discussed under Proposal 8–21) that the Instructions for Continued Airworthiness need not be finalized until delivery of the first balloon, while § 31.82, as proposed, could be interpreted to require that they be finalized before type certification. This point is clarified in § 31.82, as adopted, consistent with the corresponding requirement in Parts 23, 25, 27, and 29.

Proposal 8–90. No unfavorable comments were received on the proposal to amend § 31.85(b)(1). However, a commenter questions whether percentage figures on the required fuel quantity gauge would be acceptable. The FAA has determined that, in the particular case of balloons (for which the fuel quantity information is to an extent less important to safety than for other classes of aircraft), calibration of the fuel quantity gauge in percent of fuel cell capacity is an acceptable means of complying with the last sentence of § 31.85(b)(1). Section 31.85(b)(1), as adopted, is revised to make this clear.

Proposal 8–91. No adverse comments were received on the proposal to add a new Appendix A to Part 31. However, comments received on the proposals to add a similar appendix to Parts 23, 25, 27, and 29 (Proposal 8–25), were equally valid with respect to this proposal. Accordingly, Appendix A to Part 31, as adopted, is revised in substance as applicable.

Regarding the proposals to require generalized repair data in the Instructions for Continued Airworthiness, it is more appropriate, as well as necessary and practicable, to include specific instructions for repair of the key elements of a balloon—the balloon envelope and its basket or trapeze. This information is incorporated in paragraph A31.3(i) as revised.

Proposal 8–92. A commenter objects to § 33.4 insofar as it would require completion of the Instructions for Continued Airworthiness before the type certificate is issued, contending that a significant portion of the data and other material called for is typically not compiled until 6 months or longer after type certification. The commenter suggests that manufacturers be allowed to prepare and make available the Instructions for Continued Airworthiness before the first aircraft equipped with the subject engine is put into service, which, it claims, is the earliest such instructions would be needed. Requiring the engine manufacturer to complete the Instructions for Continued Airworthiness before the type certificate is issued would constitute an unnecessary burden. However, the FAA considers that they must be made available, and furnished, upon delivery of the first engine on an aircraft or issuance of a standard certificate of airworthiness for the aircraft, whichever occurs later. This would be consistent with corresponding requirements proposed for other products. See Proposals 8–5 and 8–21. Section 33.4 is revised and adopted accordingly.

Proposal 8-93. A commenter observes that § 33.5 requires that the instruction manual for installing and operating the engine be "approved," whereas proposed § 33.4 requires that the Instructions for Continued Airworthiness be "acceptable to the Administrator," and recommends that the latter term be used for consistency. The FAA notes that the term "acceptable to the Administrator" is widely used in Part 43 in connection with maintenance requirements, whereas the term "approved" is more frequently used in FAR Parts containing installation and operating requirements. Considering the FAR as a whole, the FAA does not agree that such consistency is essential. Accordingly, § 33.5 is adopted as proposed.

Proposal 8-94. Several commenters object to proposed §§ 33.6(e) and (f), and to proposed §§ 23.1521(a) and 25.1521(a) (Proposals 8-20 and 8-56, respectively) on the grounds that the use of rated takeoff power or thrust for 10 minutes with one engine inoperative should not be limited to "the extent that the utilization is necessary for the airplane to avoid, without necessitating turning maneuvers, obstacles beneath the flight path intended for the airplane prior to the loss of the engine." In light of these comments and after further review, the FAA concludes that these proposals are premature and they are withdrawn.

In addition, the proposed transfer of the definitions for rated power and thrust from § 1.1 to proposed new § 33.6, Proposal 8-1, is withdrawn since the transfer may cause confusion in the administration of the aircraft certification requirements. Accordingly, Proposals 8-1, 8-20, 8-56, and 8-94 are withdrawn.

Proposal 8-95. For discussion of proposed § 33.19(b) see the discussion under Proposal 8-103. Revised § 33.19 is adopted without substantive change.

Amendment to §§ 33.55(c), 33.57(b), 33.93(b), and 33.99(b). Because of the deletion of §§ 33.5(c), (d), and (e), and the addition of a new § 33.4, the reference to "§ 33.5" in §§ 33.55(c), 33.57(b), 33.93(b), and 33.99(b) is no longer appropriate. For consistency, the reference is "§ 33.4." This change was inadvertently overlooked and was not proposed in Notice 75-31 (40 FR 29410; July 11, 1975). This editorial change corrects that discrepancy. Since this amendment is clarifying in nature and does not impose a burden on the public, notice and public procedure are unnecessary and good cause exists for adopting this amendment.

Proposal 8-97. A commenter recommends that § A33.3(a)(6) of Appendix A to Part 33 be revised by adding the words "requiring periodic attention" so as to make it clear that scheduling information is required solely for parts that require such attention. The language in this section is adequate. For parts not needing periodic attention, the applicant has only to state that parts not scheduled need not be serviced.

A commenter infers incorrectly that proposed §§ 43.16 and 91.163(c) apply only to rotorcraft. These regulations with the revision proposed also affect other classes of aircraft, as well as engines and propellers.

Some comments received on the proposed appendices for Parts 23, 25, 27, and 29 (Proposal 8-25) were equally valid with respect to proposed Appendix A to both Parts 33 and 35. Accordingly, the appendices to Parts 33 and 35 are revised in substance as applicable.

Proposal 8-98. For a discussion related to proposed § 35.3 see Proposal 8-93. A commenter observes that § 35.3 requires that the instruction manual for installing and operating the propeller be "approved," whereas § 35.4 requires that the Instructions for Continued Airworthiness be "acceptable to the Administrator," and recommends that the latter term be used for consistency. The FAA notes that the term "acceptable to the Administrator" is widely used in Part 43 in connection with maintenance requirements, while the term "approved" is more frequently used in FAR parts containing installation and operating requirements. Considering the FAR as a whole, the FAA does not agree that consistency is required in this instance. Accordingly, § 35.3 is adopted as proposed.

Proposal 8-99. In response to the concern of a commenter representing a number of Part 121 operators, the FAA notes that there is no requirement that any operator/owner use the Instructions for Continued Airworthiness referred to in proposed § 35.4. The new §§ 43.13(a), 43.16, and 91.163(c) allow the use of other methods. In particular, the use of maintenance manuals and continuous airworthiness maintenance programs developed under Parts 121, 123, 127, and 135, or an inspection program approved under § 91.217(e) would be acceptable alternatives to the Airworthiness Limitations section. This commenter suggests that language be added to proposed § 35 4 to make it clear that such alternatives may be used. The FAA agrees. The language in §§ 43.16 and 91.163(c) is revised accordingly.

Consistent with the discussion on proposed § 33.4 dealing with engines (see Proposal 8-92), the FAA finds that requiring the propeller manufacturer to complete the Instructions for Continued Airworthiness before the type certificate is issued would constitute an unnecessary burden. Accordingly, § 35.4 as adopted, requires that those instructions be made available and furnished upon delivery of the first aircraft with the propeller installed, or upon issuance of a standard certificate of airworthiness for an aircraft with the propeller installed, whichever occurs later.

Proposal 8-100. No unfavorable comments were received on the proposal to amend § 35.5 to more clearly indicate the basis for operating limitations and where they are listed. Accordingly, § 35.5 is adopted without substantive change.

Proposal 8-101. No unfavorable comments were received on the proposal to amend § 35.23 to provide an extreme low pitch indication. Accordingly, § 35.23 is adopted without substantive change.

Proposal 8-102. A commenter does not concur with the proposal to revise § 35.37 to require evaluation of metallic hubs and blades, stating that the words "must", "all", and "reasonably foreseeable" in the second sentence imply responsibility beyond current knowledge and the state of the art. The FAA does not agree. These terms are used in the current rule and the current state of the art defines the limits of the provision.

The same commenter recommends that § 35.37 be revised to apply to consideration of "normal and reasonably foreseeable load patterns," to account for the fact that only normal operations will or should be considered. The FAA does not agree. Load patterns which are reasonably foreseeable are critical and should be investigated even if they are not normal.

The same commenter also indicates that the third sentence should be revised to eliminate the term "reduction factors," since reduction factors are identified with only one particular method of presentation. The FAA agrees and the section is revised accordingly. This commenter finally states that the explanation implies that manufacturers have not taken permissible damage and material variation into account. This implication is not intended. It is the FAA's view that the fatigue evaluation should consider the occurrence of typical service damage and variation in material properties and the rule would provide for such an evaluation.

Another commenter suggests that the section be revised by adding certain technical requirements that are related to infinite component life. It is not necessary to specify requirements concerning infinite component life, since they are considered a normal part of propeller fatigue testing.

Section 35.37 is adopted as revised.

Proposal 8-103. A commenter objects to the proposal to add a new § 35.42 to define durability requirements for propeller blade pitch control system components, stating that the term "bench tests" in §§ 35.42(a) and (b) is too descriptive and restrictive. The FAA agrees that a reference to "bench tests" may be too restrictive. Other test methods may be equally acceptable in providing the necessary data. Accordingly, §§ 35.42(a) and (b) are revised to eliminate the specific reference to "bench."

The commenter also suggests that the words "in frequency and amplitude" be eliminated from § 35.42(a) since the words "cyclic testing" are fully descriptive. The FAA believes that these words are needed to prescribe key elements in the required test.

The commenter further suggests that the proposed testing to the equivalent of 1,000 hours of propeller operation is too restrictive in the case of a propeller with an overhaul period of less than 1,000 hours. The FAA considers the specific testing to be the minimum necessary to provide an acceptable safety level in service. The rule does not, however, prevent the selection of overhaul intervals of less than 1,000 hours.

Finally, the commenter suggests that the rule should permit an alternate of acceptance based upon service experience. The FAA recognizes that service experience can provide a statistical basis for determining component reliability. Its applicability, however, may vary according to such considerations as type of operation, the nature of the article under consideration, the degree of similarity between the reference article and the certification article, and the completeness of service records. Since it is dependent on such a variety of factors, the FAA does not agree that a specific alternative based on service experience should be included.

The proposal to add a new § 35.42, therefore, is adopted with the change discussed below. No adverse comments were received on the related proposed revisions to §§ 23.905, 25.905, and 33.19 to add the reference to new § 35.42, and the revisions are adopted.

Proposal 8-104. For comments related to the proposal to add a new Appendix A to Part 35, see Proposals 8-25 and 8-97.

A commenter objects to proposed § A35.1(c) of the appendix because the propeller owner (aircraft operator) would be wastefully provided with instructions and data that the propeller owner has no authority to use. The FAA does not agree. The Instructions for Continued Airworthiness must be furnished to the aircraft owner/operator who is the person responsible for maintaining the aircraft (including the propeller). The owner/operator may not be authorized to maintain the propeller, but the owner/operator can place the instructions in the hands of persons who are authorized.

The new Appendix A to Part 35, as adopted, is revised in accordance with comments discussed in Proposal 8-97.

Proposal 8-105. The proposed revision of § 43.9(a)(4) is being deferred for consideration in a forthcoming notice of proposed rule making of the Operations Review Program.

Proposal 8-106. A commenter representing a number of scheduled air carriers is concerned that the use of maintenance manuals and continued airworthiness programs developed under current § 121.133 and Subpart L of Part 121 (generally via Maintenance Review Board procedures), or under similar provisions of Parts 127 and 135, might not be acceptable as "other methods, techniques, and practices" under the terms of proposed § 43.13(a). This commenter suggests that language be added to proposed § 43.13(a) to make this clear. The FAA does not agree. The proposed language states that the use of such manuals and continued airworthiness programs is acceptable.

Proposal 8-107. A commenter representing a number of scheduled air carriers recommends that the Airworthiness Limitations section referred to in proposed § 43.16 include life limitations only and not inspections or other maintenance items. As discussed under Proposal 8-3, the FAA does not agree.

A commenter suggests that the words "or other methods, techniques; and practices acceptable to the Administrator" be added at the end of proposed § 43.16 to make it consistent with proposed § 43.13(a). The Airworthiness Limitations section contains specific mandatory replacement times and inspection intervals (with related procedures) that must be complied with, unless it can be shown by an operator with an approved maintenance program that these times are inappropriate for his operation. The use of alternatives not covered in the Airworthiness Limitations section would be allowed if

approved by the Administrator. Section 43.16 is revised to specifically state the alternatives to compliance with the Airworthiness Limitations section.

Proposal 8-108. No unfavorable comments were received on the proposal to amend § 45.11 to qualify, with respect to manned free balloons, the requirements in § 45.11(a) that deal with the location of the identification plate. Accordingly, the proposal is adopted without substantive change.

Proposal 8-109. No unfavorable comments were received on the proposal to amend § 45.13 to correctly reference §§ 45.11(a) and (b) with regard to identification plate requirements. Accordingly, the proposal is adopted without substantive change.

Proposal 8-110. A commenter representing a number of scheduled air carriers recommends that the words "inspection interval, or related procedure" be deleted from proposed § 45.14. The supporting rationale is the same as submitted by this commenter concerning Proposal 8-3 to amend § 21.31(c). As discussed under Proposal 8-3, the FAA disagrees.

The language in § 45.14 covers rotorcraft as well as airplanes, balloons, engines, and propellers. To make this clear, the word "Rotorcraft" is changed to "Manufacturer's".

Two commenters object to proposed § 45.14 on the grounds that it would be impracticable to mark small parts with a part and serial number. The FAA is not aware that the marking of small parts under current § 45.14 has presented a problem. In any event, the rule allows markings that are equivalent to part and serial numbers, such as symbols enabling the identification of the part as one for which a replacement time, inspection interval, or related procedure is specified in an Airworthiness Limitations section. Identification of such parts is clearly essential for safety. Accordingly, § 45.14 is adopted as revised.

Proposal 8-111. A commenter representing a number of scheduled air carriers recommends that the words "inspection interval, or related procedure" be deleted from proposed § 91.163(c). The supporting rationale is the same as that submitted by this commenter concerning Proposal 8-3 to amend § 21.31(c). As discussed under Proposal 8-3, the FAA disagrees. However, § 91.163(c) is revised to specifically identify the acceptable alternatives to compliance with the "Airworthiness Limitations" section.

The language in proposed § 91.163(c) covers rotorcraft as well as airplanes, balloons, engines, and propellers. To make this clear, the word "Rotorcraft" in § 91.163(c) has been changed to "Manufacturer's", and a statement has been added that operations specifications approved by the Administrator may be used in lieu of the Instructions for Continued Airworthiness. Section 91.163(c) is adopted as revised.

Proposal 8-112. No unfavorable comment was received on the proposal to amend § 91.165 to clarify maintenance personnel entries in maintenance records. Accordingly, the proposal is adopted without substantive change.

Proposal 8-113. Several commenters object to §§ 91.173(a)(2)(i) and (iii). A commenter states that adoption of the proposal would result in an inconsistency between § 91.173 and § 121.380, which contains the recordkeeping requirements for aircraft maintained under Part 121. The commenter also states that this inconsistency would cause great difficulty and economic hardship whenever an aircraft is sold by a Part 121 operator to a Part 91 operator and the Part 91 aircraft is maintained by a Part 121 operator under its repair station certificate. According to the commenter, the economic hardship would occur to both the Part 91 operator and the repair station. The same commenter contends that reliability information accumulated in recent years on transport category airplanes shows that there is no need for individualized total time records on equipment and components. Another commenter states that proposed requirements would result in large increases in maintenance costs for Part 91 operators and that only those components that are life-limited should have to carry total times.

The FAA concludes, however, that revision of § 91.173(a)(2)(i) would contribute significantly to safety with little burden on those affected. The currently prescribed record of total time in service for the airframe does not generally apply to the aircraft's engines

or propellers, since these components are frequently overhauled (or replaced) at different times. As a practical matter, it is known that operators of such aircraft normally keep records from which the total time in service of engines and propellers can be derived. Therefore, the FAA does not agree that the requirement to keep total times on engines and propellers would be a hardship and burden upon the operators. Accordingly, § 91.173(a) (2) (i) is adopted without change.

In light of the comment on proposed § 91.173(a) (2) (iii), the FAA has given further review of the proposal and has concluded that existing requirements satisfy the objective of the proposal. Accordingly proposed § 91.173(a) (2) (iii) is withdrawn.

The reporting and recordkeeping requirements contained in § 91.173 have been approved by the Office of Management and Budget in accordance with the Federal Reports Act of 1942.

Proposal 8-114. Several commenters agree with the intent of proposed § 91.193(c) (4) but suggest changes. A commenter suggests that the proposed installation instructions for hand fire extinguishers would be more appropriately placed in the type certification rules. The FAA does not agree. New type certification rules do not apply to aircraft already in service.

A commenter suggests that the words "unless obvious" be added to clarify when the hand fire extinguisher stowage provisions must be properly identified. The FAA agrees. Proposed § 91.193(c) (4) is revised and adopted accordingly.

Proposal 8-115. One commenter objects to the proposal to revise § 91.197(a) to require passenger information signs to meet the requirements of § 25.791. The commenter states that it is unnecessary, in many small general aviation aircraft operating under Subpart D of Part 91, to have such signs just for the sake of uniformity. The commenter also states that "nonstandard" signs now in use are wholly adequate to meet the needs of the type of operation. Finally, the commenter points out that installation costs for aircraft not currently having signs would be high and the pilot could just as easily announce the information as he could activate the signs.

Based on these comments and considering the type of operation involved, the FAA finds that the benefits associated with the proposal do not warrant its adoption. The proposal to revise § 91.197(a) is withdrawn.

Proposals 8-116, 8-117, 8-118, and 8-119. Final action on Proposals 8-116, 8-117, 8-118, and 8-119 was taken in Airworthiness Review Program, Amendment No. 8: Cabin Safety and Flight Attendant Amendments (45 FR 7750; February 4, 1980).

Proposal 8-120. In light of the need to conduct further testing of protective breathing equipment, the FAA withdraws its proposal to amend § 121.337, which will be addressed in an upcoming notice of proposed rule making.

ADOPTION OF THE AMENDMENT

Accordingly, Parts 11, 21, 23, 25, 27, 29, 31, 33, 35, 43, 45, and 91 of the Federal Aviation Regulations are amended, effective October 14, 1980.

(Sections 313(a), 601, 603, and 604 of the Federal Aviation Act of 1958 (49 U.S.C.1354(a), 1421, 1423, and 1424)); and Section 6(c) of the Department of Transportation Act (49 U.S.C.1655(c)))

The FAA has determined that this document involves a regulation which is not significant under Executive Order 12044, as implemented by Department of Transportation Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). A copy of the final evaluation prepared for this document is contained in the docket. A copy of it may be obtained by writing to the individual and address listed in the "For Further Information Contact" paragraph.

Amendment 43-21
Establishment of New Part 125
Prescribing Certification and Operation Rules for Certain Large Airplanes

Adopted: October 2, 1980 **Effective: February 1, 1981**

(Published in 45 FR 67214, October 9, 1980)

SUMMARY: These amendments establish a uniform set of certification and operation rules for large airplanes having a seating capacity of 20 or more passengers or a maximum payload capacity of 6,000 pounds or more when used for any purpose other than common carriage. These rules substantially upgrade the level of safety applicable to large airplanes formerly operated under Part 91, which provides basic general operating and flight rules for all operations. The number and types of accidents involving large airplanes operating under Part 91 demonstrate the need for this upgrading. Moreover, because the applicability of these rules does not depend upon a compensation or hire test, they enhance the FAA's capability to ensure that many more members of the public are afforded a higher level of safety. This rule is the final step in a regulatory upgrade and modernization program that has become essential with the continued deregulation of air transportation.

FOR FURTHER INFORMATION CONTACT: Harold E. Smith, Regulatory Projects Branch (AVS-24), Safety Regulations Staff, Associate Administrator for Aviation Standards, 800 Independence Avenue, SW., Washington, D.C. 20591, Telephone (202) 755-8716.

SUPPLEMENTARY INFORMATION:

Notice of Proposed Rule Making

These amendments are based on Notice of Proposed Rule Making 79-19 (44 FR 66324; November 19, 1979). All interested persons have been given an opportunity to participate in the making of these amendments and due consideration has been given to all matters presented. Except for the changes discussed below, these amendments and the reasons for their adoption are the same as those stated in Notice 79-19.

Background of This Rulemaking Proceeding

This rule culminates an extended effort by the FAA to upgrade and standardize the regulations applicable to certain large airplanes used in noncommon (private) carrier commercial operations (carriage other than common carriage is private carriage). In 1970, the Secretary of Transportation directed the Assistant Secretary for Safety and Consumer Affairs, Office of the Secretary of Transportation, to conduct an indepth study of charter operations utilizing large airplanes. Notice 79-19 summarizes the recommendations made as a result of that study. In short, the study recommended that new regulations be developed for large airplanes, pressurized airplanes, and turbine-powered airplanes engaged in noncommon carriage. Emphasis was placed on achieving a standard appropriate to the operation of transport category airplanes, including requirements for crew proficiency, operations, and airworthiness, that would provide a level of safety which compares favorably with Part 121. The study also recommended the establishment of a new part in the Federal Aviation Regulations (FAR) which would apply a single set of regulations to large airplanes used for various purposes, including those used for compensation or hire but excluding common carriage which would continue to be regulated under Part 121. One important feature of those recommendations was that "FAA field inspectors would no longer be required to make an economic determination of what constitutes operation 'for compensation or hire.'" The antique nature of the "compensation or hire" test is illustrated by the fact that it originated with the regulation of ground transportation under the Interstate Commerce Act which was enacted in the late 1800's. The test is presently contained in the definition of a "commercial operator" in the FAR and is essentially the same as the definition adopted in 1949 by the Civil Aeronautics Board. Sec-

tion 1.1 defines "commercial operator" as "a person who, for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier. . . ." Where it is doubtful whether the operations are "for compensation or hire," the test has been "whether the carriage by air is merely incidental to the person's other business or is, of itself, a major enterprise for profit."

The FAA partially implemented the recommendations of the 1970 Department of Transportation Task Force in 1972 with the adoption of new Subpart D of Part 91, which was the initial step in upgrading the level of safety applicable to large airplanes.

Since 1972 the FAA has carefully monitored the operating experience of large airplanes engaged in noncommon carriage operations. There are a number of significant aspects to this operating experience. First, and perhaps the key aspect, is the fact that the economic test of "compensation or hire" has proved to be a nebulous guide to both the FAA and the aviation community in attempting to determine whether the operations fall within Subpart D of Part 91 or under the commercial operator regulations of Part 121. The agency found that many sham arrangements have been developed by some operators to mask de facto commercial operations so that they can be conducted under Part 91. Despite the FAA's efforts to detect these illegal operations, frequently it is only after an accident or incident that sufficient facts are available to unmask the illegal operator. Once the unfortunate event occurs, the violator is subject to enforcement action. It would be far better, however, for the accident or incident to have been prevented. The difficulties in application of the "compensation or hire" test are not limited to the unscrupulous operator. There have been instances in which a lessee of a large airplane has assumed responsibility unwittingly for its operation without recognizing the obligations. Many operators who desire to comply with the applicable regulations have, in good faith, experienced confusion over whether they are entitled to operate under Part 91 or whether they are required to obtain a commercial operator certificate. Many interpretations have been sought and issued, which require substantial time and effort on the part of the public and FAA personnel.

Another aspect of the experience involving U.S.-registered large airplanes, ostensibly operating under Subpart D, is the significant number of accidents which have occurred. Post-accident investigations indicate a wide range of deficiencies, including defective engines, failure of the crew to hold proper certificates, improper flight planning, improper operating technique, and failure to ascertain weight and balance limitations. This rule should preclude the occurrence of many of these types of accidents. The following table lists some of the accidents involving large airplanes operating under Part 91 which occurred in the period 1972–1979. This table was developed from National Transportation Safety Board data.

* * * * *

Further, the Task Force's recommendation to establish a single set of regulations applicable to large airplanes in noncommon carriage operations is validated by changes in operational concepts which occurred subsequent to the Airline Deregulation Act of 1978. That Act substantially relaxes the statutory economic restrictions on air carrier certification and route authority which existed for many years. It encourages competition in the marketplace. One result is that there is now incentive for persons such as commercial operators to enter common carriage operations as air carriers. FAA records show that four commercial operators of large airplanes have become air carriers since the October 1978 effective date of that Act.

Air travel clubs operate large, airline-type airplanes and, as a group, they have experienced significant changes in the short period of time between the issuance of Notice 79-19 and the issuance of this final rule. There were 11 air travel clubs in November 1979 and on May 20, 1980, there were only 7. This reduction implies that the need for air travel clubs, as traditionally constituted, is diminishing in today's environment. The FAA's regulatory program, as revised by Part 125, provides meaningful alternatives for travel

clubs. They may seek common carrier certification under Part 121, or, if they do not wish to become common carriers, they may operate under Part 125 which does not restrict the charges which may be made. Current Part 123 defines an "air travel club" as "a person who engages in the carriage by airplanes of persons who are required to qualify for that carriage by payment of an assessment, dues, membership fee, or other similar type of remittance." This limitation on compensation, of course, does not apply under Part 125. This is a substantial benefit to travel clubs. One travel club requests a short-term exemption to permit it to operate in the manner contemplated by Part 125 until the Part becomes effective. That club also states that if Part 125 is not adopted, it intends tooseek CAB authority to operate as a supplemental carrier.

Similar revenue opportunities exist under Part 125 for corporate transport and aircraft lease and aviation service operators.

Role of Part 125 in FAA Enforcement Program

Part 125 is an integral part of the FAA's stepped-up enforcement program designed to reduce accidents and enhance compliance with the FAR. Part 125 is aimed primarily at operators who use subterfuges to avoid compliance with appropriate regulations. Part 125 will make it easier to detect these operators and take appropriate enforcement action. It also should serve to deter persons from attempting to evade the regulations because the risk of detection is increased. Other parts of this enforcement program include:

- Numerous large civil penalties collected from large air carriers, commuter/air taxi operators, and manufacturers in 1979.
- Proposed legislation to raise the maximum civil penalty for each FAR violation from $1,000 to $25,000 and to authorize the FAA to seek criminal penalties in flagrant cases.
- Issuance of a new enforcement handbook, which consolidates all enforcement material into one source and contains many new provisions for guidance of FAA personnel.
- Agreement with the Department of Justice on a method to speed up processing of enforcement actions in the courts.
- Development of a computer-based system which will give agency personnel prompt access to an airman's or an operator's compliance record.

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PART 43

§ 43.15 Additional performance rules for inspections.

Notice 79-19 proposed amending this section by substituting the words "Part 125" for "Part 123" in § 43.15(a).

Since time to make the change from the provisions of Part 123 to those of Part 125 is included in the final rule for operators holding a Part 123 certificate on the effective date of Part 125, deletion of Part 123, as proposed, is inappropriate. Therefore, § 43.15(a) is amended by adding the words "Part 125" following "Part 123" in the first sentence of the section.

* * * * *

ADOPTION OF THE AMENDMENTS

Accordingly, the Federal Aviation Regulations (14 CFR Chapter I) are amended, effective February 1, 1981, by establishing a new Part 125 under Subchapter G and by amending § 43.15(a) of Part 43.

(Secs. 313, 601 through 610, and 1102, Federal Aviation Act of 1958, as amended (49 U.S.C. 1354, 1421-1430 and 1502); sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c)).)

Note—The FAA has determined that this document involves a regulation which is significant under Executive Order 12044, as implemented by DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). A copy of the final regulatory evaluation prepared for this action is contained in the regulatory docket. A copy of it may be obtained by contacting the person identified under the caption "For Further Information Contact."

NOTE: The complete preamble to Amendment 43-21 is contained in new Part 125.

Amendment 43-22

Amendments of Effective Date of Part 125 and Amendments Adopted in Relation to Part 125

Adopted: January 30, 1981 **Effective: April 1, 1981**

(Published in 46 FR 10902, February 5, 1981)

SUMMARY: On January 29, 1981, the President issued a memorandum to certain agency heads directing that they issue a notice in the *Federal Register* postponing for 60 days after January 29, 1981, the effective date of regulations that have already been issued but were scheduled to become effective in the next 60 days. This amendment consistent with the President's directive, postpones the effective date of new Part 125 and related amendments from February 1, 1981, to April 1, 1981.

FOR FURTHER INFORMATION CONTACT: Harold E. Smith, Regulatory Projects Branch (AVS-24), Safety Regulations Staff, Associate Administrator for Aviation Standards, 800 Independence Avenue, SW., Washington, D.C. 20591, Telephone (202) 755-8716.

SUPPLEMENTARY INFORMATION:

Background

Part 125 was published in the Federal Register on October 9, 1980, (45 FR 67214). That Part, and related amendments to Parts 43, 91, 121, 123, 135, and 145 have an effective date of February 1, 1981. On January 29, 1981, the President issued a memorandum which directs that all agencies, by notice in the Federal Register, postpone for 60 days from January 29, 1981, the effective date of all regulations that have been promulgated in final form and that are scheduled to become effective during that 60 day period. Part 125, and regulations adopted with it, fall within the scope of the President's memorandum.

The President stated in his memorandum that the establisnment of a new regulatory oversight program that will lead to less burdensome and more rational Federal regulations was among his priorities as President. He indicated that this program was especially important because of the country's economic climate.

In order to give his Administration, through the Task Force on Regulatory Relief, sufficient time to implement that process and to subject to full and appropriate review many recent regulations that would increase rather than relieve the current burden of restrictive regulation, he directed the postponement of pending regulations.

Consistent with this view, I am by this notice postponing for 60 days the effective day of Part 125.

Description of These Amendments

The effective date of Part 125 and of related Amendments 43-21, 91-169, 91-170A, 121-164, 123-9, 135-7, and 145-17 is changed from February 1, 1981, to April 1, 1981. In addition, in order to preserve the application and compliance procedure timing, certain dates specified in any of the related amendments listed in the preceding sentence are revised. However, although the effective date of Amendment 91-170A is changed from February 1, 1981, to April 1, 1981, the designation date of November 29, 1980, for applicable noise rules is unchanged.

Need for Immediate Adoption

The FAA realizes that the postponement of pending regulations may not be viewed by certain persons to be in their best interest. However, in accordance with the President's directive, the economic condition of the nation is such that the government must rethink the need and expense of each new regulation. For a new Administration and any new Department head to effectively accomplish this objective, some time is needed for

adequate review. Sixty days is the minimum period to accomplish such a review and the impact of such a delay will be minimal. For these reasons, the FAA is convinced that good cause exists for postponing for up to 60 days this effective date of this rule for 60 days and that the end result of such a delay, a more cohesive and effective regulatory program, is in the public interest. For similar reasons and because of this rule is scheduled to become effective very shortly, additional notice and public procedure on this change of effective dates is impracticable, unnecessary and contrary to the public interest and good cause exists for making these changes effective immediately. Since this change of effective dates must be accomplished immediately and does not involve rulemaking, compliance with Executive Order 12044 is also unnecessary.

Accordingly consistent with the President's memorandum of January 29, 1981, on Postponing of Pending Regulations, the effective dates of Part 125 is postponed until April 1, 1981.

Adoption of the Amendment

Accordingly, 14 CFR Chapter 1 is amended as follows:

1. By amending the effective date February 1, 1981, of Part 125 and Amendment Nos. 43-21, 91-169, 91-170A, 121-164, 123-9, 135-7, and 145-17 to read April 1, 1981 in each case.

(Secs. 307, 313, 601 through 611, and 1102, Federal Aviation Act of 1958, as amended (49 U.S.C. 1348, 1354, 1421-1431 and 1502); sec 6(c) Department of Transportation Act (49 U.S.X. 1655(c)); Title III, Aviation Safety and Noise Abatement Act of 1979 (94 Stat. 50).

Additional Actions Pending

In addition to the amendments adopted herein, the Agency has other regulatory actions as to which it has not been able to act to carry out the President's memorandum because they have been issued by the various FAA Regions. These include, but are not limited to, airworthiness directives, airspace actions, and standard instrument approach procedures. Additional postponements of these regulations will be issued in the next several days to comply with the President's memorandum.

Amendment 43-22A

Amendments of Effective Date of Part 125 and Amendments Adopted in Relation to Part 125

Adopted: February 3, 1981 **Effective: February 3, 1981**

(Published in 46 FR 10903, February 5, 1981)

SUMMARY: This document reestablishes the effective date of new Part 125 and related amendments to February 3, 1981. This change in effective date is necessary since the Office of Management and Budget, in accordance with the President's Memorandum dated January 29, 1981, concerning postponement of pending regulations, authorized the FAA to allow Part 125 to become effective without further delay.

FOR FURTHER INFORMATION CONTACT: Edward P. Faberman, Assistant Chief Counsel for Regulations (AGC-200), Regulations and Enforcement Division, Office of the Chief Counsel, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591; telephone: (202) 426-3235.

SUMMARY INFORMATION:

Background

Part 125 was published in the Federal Register on October 9, 1980, (45 FR 67214). That Part, and related amendments to Parts 43, 91, 121, 123, 135, and 145 had an effective date of February 1, 1981. On January 29, 1981, the President issued a memorandum which directed that all agencies, by notice in the Federal Register, postpone for 60 days from January 29, 1981, the effective date of all regulations that had been promulgated in final form and that were scheduled to become effective during that 60 day period. Part 125, and regulations adopted with it, fall within the scope of the President's memorandum.

In accordance with the President's memorandum the effective date of Part 125 was postponed by notice which is published in today's Federal Register. That notice was issued on January 30, 1981, and forwarded to the Federal Register for publication. The Department of Transportation asked the Office of Management and Budget to allow Part 125 to become effective without delay. OMB reviewed that request and advised the Department on February 3, 1981, that Part 125 could become effective in accordance with the President's memorandum. This approval, however, was received by the Department after the Notice postponing the effective date had already been sent to the Government Printing Office by the Office of Federal Register. Therefore, it is necessary to issue this document to establish the effective date for Part 125 as February 3, 1981.

Consistent with this view, I am by this Notice establishing the effective date of Part 125 as February 3, 1981.

Description of Changes

The effective date of Part 125 and of related Amendments 43-21, 91-169, 91-170A, 121-164, 123-9, 135-7, and 145-17 is changed to February 3, 1981. In addition, in order to preserve the application and compliance procedure timing, certain dates specified in any of the related amendments listed in the preceding sentence are similarly revised.

Need for Immediate Adoption

Since the Office of Management and Budget approval was too late to stop publication of the January 30 Notice and since the Notice must be rescinded, I find that notice and public procedure are impracticable and contrary to the public interest and good cause exists for making these amendments effective in less than 30 days.

Change of Dates

Accordingly, 14 CFR Chapter 1 is changed as follows:

1. By changing the effective date of Part 125 and Amendment Nos. 43-21, 91-169, 91-170A, 121-164, 123-9, 135-7, and 145-17 to read February 3, 1981 in each case.

(Secs. 307, 313, 601 through 611, and 1102, Federal Aviation Act of 1958, as amended (49 U.S.C. 1348, 1354, 1421-1431 and 1502); Sec. 6(c) Department of Transportation Act (49 U.S.C. 1655(c)); Title III, Aviation Safety and Noise Abatement Act of 1979 (94 Stat. 50).

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Amendment 43-23

Operations Review Program: Amendment No. 12: Aircraft Maintenance

Adopted: July 29, 1982 **Effective: October 15, 1982**

(Published in 47 FR 41076, September 16, 1982)

SUMMARY: These amendments to Parts 43 and 91 make them compatible with other rules, consolidate the inspection requirements to make them easier to use and more understandable, specify the conditions under which the terms "rebuilt" and "overhaul" may be used in maintenance records, and allow Canadian Nationals to perform certain aircraft inspections on U.S.-registered aircraft. The amendments are part of the Operations Review Program and are based on a compilation of proposals made at the Operations Review Conference.

FOR FURTHER INFORMATION CONTACT: Charles W. Schaffer, Jr., General Aviation and Commercial Branch, AWS-344, Aircraft Maintenance Division, Office of Airworthiness, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591; Telephone: (202) 426-8203.

SUPPLEMENTARY INFORMATION:

History

This amendment is issued as part of the Operations Review Program. The following amendments have previously been issued as part of this program:

	Title and Federal Register (FR) Citation
Amendment No. 1:	Clarifying and Editorial Changes (41 FR 47227; October 28, 1976).
Amendment No. 2:	Rotorcraft External-Load Operations (42 FR 24196; May 12, 1977 and 42 FR 32531; June 27, 1977).
Amendment No. 2A:	Special Federal Aviation Regulation No. 36, Development of Major Repair Data (43 FR 3084; January 23, 1978).
Amendment No. 3:	Airspace, Air Traffic, and General Operating Rules (44 FR 15654; March 15, 1979).
Amendment No. 4:	Miscellaneous Amendments (43 FR 22636; May 25, 1978).
Amendment No. 5:	Certification and Operations: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft (43 FR 22643; May 25, 1978, 43 FR 28403; June 29, 1978, and 44 FR 25201; April 30, 1979).
Amendment No. 6:	General Operating and Flight Rules and Related Airworthiness Standards and Crewmember Training (43 FR 46230; October 5, 1978).
Amendment No. 8:	Certification and Operations: Domestic, Flag, and Supplemental Air Carriers and Commercial Operators of Large Aircraft; Operation of Scheduled Air Carriers with Helicopters; and, Airworthiness Standards for Transport Category Airplanes (45 FR 41586; June 19, 1980).
Amendment No. 9:	Operations Review Program: Amendment No. 9 (45 FR 46736; July 10, 1980).
Amendment No. 10:	Airworthiness, Equipment, and Operating Rules (44 FR 61323; October 25, 1979).
Amendment No. 11:	Operations Review Program: Amendment No. 11 (47 FR 33384; August 2, 1982).

These amendments are based on Notice of Proposed Rulemaking 80-22 published in the *Federal Register* November 20, 1980 (45 FR 76894). Interested persons have been given an opportunity to participate in the making of these amendments and due consideration has been given to all comments presented. A number of changes of an editorial and clarifying nature have been made to the proposed rules based on relevant comments received and upon further consideration by the FAA. Except for these minor changes, the amendments and the reasons for their adoption are the same as those contained in Notice 80-22. Some comments received made recommendations for changes which are beyond the scope of the Notice and cannot be considered without further notice and public consideration.

Discussion of Comments

The following discussions are keyed to the like-numbered proposals contained in Notice 80-22.

Proposal 12-1. This change clarifies the meaning of the terms "rebuilt" and "overhauled" for aircraft owners and operators by adding a new § 43.2 which specifies the conditions under which maintenance personnel may use the terms in maintenance records.

Several commenters object stating that there is no demonstrated need for the definitions. Others suggest that § 43.2 should appear as § 43.8 to be near § 43.9, or be made a part of § 43.9, since it deals with recordkeeping requirements. Aircraft owners and operators need to know what work has been accomplished on their equipment when they see these words in their maintenance records. Moreover, § 43.2 is neither a definition nor a recordkeeping requirement. Instead, the rule specifies the conditions which must be met before the terms "rebuilt" and "overhauled" may be used in required maintenance records.

Other commenters suggest that the phrase "supplemental type certificate" be added to the proposed language of § 43.2(a) (2) and (b) to clarify the position of supplemental type certificate holders. Since this addition to § 43.2(a) (2) clarifies the regulatory requirement, the phrase has been included in the final rule.

Two commenters state that § 43.2(a) requires cleaning, and is inconsistent with § 43.2(b) which does not. Cleaning is a standard practice in both instances, and the word "cleaning" has been added to § 43.2(b).

One commenter recommends the phrase "specified by the manufacturer holding the type certificate or a material, part, process, or appliance approved under § 21.305 of this chapter" be added following the phrase "tolerances and limits" in § 43.2(b) because "new parts" is not specific. "New parts" is adequate since it is known that the tolerances and limits for new parts are established during original certification by the product or part manufacturer. Accordingly, the suggested phrase has not been included.

Several commenters state the term "completely disassembled" is inappropriate because in numerous instances "complete" disassembly would damage the product beyond further service. The word "complete" is deleted. However, it is intended that disassembly should be to the extent required to make a complete determination of conformity with the product's original qualities.

A commenter states that the word "approved" as used in § 43.2(b) should be clarified to indicate that it means "manufacturer approved." The FAA disagrees since undersize and oversize parts are FAA approved through the product approval procedure.

One commenter suggests a complete rewording of § 43.2. The suggested wording would not achieve the objective of § 43.2 as proposed. Accordingly, § 43.2 is adopted as proposed with the changes discussed above.

Proposal 12-2. This change to § 43.3(a) adds the phrase "and § 43.17" to recognize that mechanical work may be performed on U.S.-registered aircraft in Canada by appropriately certificated Canadian mechanics under § 43.17.

Additionally, § 43.3(d) is amended to prohibit noncertificated persons, working under the supervision of the holder of a mechanic or repairman certificate, from performing any inspections required by Parts 91 and 125.

Section 43.3(h), as amended, permits manufacturers to perform any inspection required by Part 91 or Part 125 in addition to the 100-hour, annual, and progressive inspections previously allowed.

One commenter points out that the language of the proposal is inconsistent with that of SFAR-38 and will introduce confusion when applied to Parts 121, 127, 129, and 135. Clarifying changes have been made to § 43.3(f) which eliminate the need for existing paragraph (g). Similarly, existing paragraph (h) is clarified and redesignated paragraph (g).

A number of commenters object to the proposed use of the phrase "However, this paragraph does not authorize the performance of any inspection required by this chapter" in § 43.3(d), stating that the phrase precludes the use of noncertificated personnel when conducting inspections under § 121.367, and when an airline conducts inspections under § 91.169(e). It was also stated that it would prevent use of noncertificated personnel under § 145.59. The language has been changed by use of the phrase "required by Parts 91 and 125 of this chapter" in lieu of the proposed "required by this chapter."

Proposal 12-3. This change clarifies the difference between the terms "approve for return to service" and "return to service." The term "approve for return to service" is inserted in § 43.5 and "return to service" is inserted in Part 91.

One commenter points out that proposed § 43.5(a) makes reference to entries required by § 43.9 but not to those required by § 43.11 and that without such reference, entries regarding inspection would no longer be required. It was not intended that existing requirements be changed. Rather, as explained in the NPRM, the intent was to relocate the requirements to the maintenance or operations rules most closely associated with the user. Accordingly, the phrase "or § 43.11, as appropriate," has been inserted in § 43.5(a) (2) and makes no change to existing requirements. The rule is otherwise adopted as proposed.

Proposal 12-4. This change to § 43.7 requires persons holding at least a private pilot certificate to approve an aircraft for return to service after performing preventive maintenance under the provisions of § 43.3(g). This will result in more complete maintenance records since present § 43.5(b) does not require pilots to record, or approve for return to service, work accomplished as preventive maintenance. The provision "and in § 43.17" is added to § 43.7(a) to reflect that mechanical work may be performed on U.S.-registered aircraft by Canadian mechanics under § 43.17 as discussed under the explanation for § 43.3 (Proposal 12-2).

A number of commenters suggest that insertion of the phrase "or component part" in § 43.7(a) alone could lead to the interpretation that approval for return to service of component parts would be limited to the Administrator. It is not the intent of the FAA to limit such approvals and, consistent with present industry practice, the phrase is incorporated in all except the last paragraph of § 43.7 to make it clear that items other than a complete airframe, engine, propeller, or appliance may be approved for return to service.

A number of commenters object to proposed § 43.7(g) stating that pilots should not be permitted to approve maintenance for return to service. This is an apparent misunderstanding since the proposal permits a pilot to approve only preventive maintenance that that pilot accomplishes under § 43.3(g). Pilots may do this under the present rule. Another commenter states that the proposed wording would prohibit a student pilot from performing preventive maintenance. This is correct. The restatement clarifies this limitation on student pilots.

One commenter points out that the inconsistency between § 43.7(e) and recent changes to Part 121. For explanation, see change to § 43.1 following Proposal 12-24.

Section 43.7(g) as proposed (redesignated (f)) contained a reference to § 43.3(h). For consistency, changes to § 43.3 require that this reference be changed to § 43.3(g). Changes made to § 43.7(e) eliminate the need for paragraph (f), since commercial operators are included in the term "an operating certificate issued under Part 121, 127, or 135", and accordingly, present § 43.7(f) is deleted.

Proposal 12-5. This change to § 43.9 will, in addition to present requirements, require maintenance record entries to identify the kind of certificate held by the person who approved the aircraft, engine, propeller, appliance, or component for return to service. With this change, all persons, including pilots performing preventive maintenance, are required to record approval for return to service in accordance with § 43.9(a). This change also requires pilots, mechanics, and air agencies, to indicate the kind of certificate under which the actions were taken, that is, repair station, mechanic, private pilot, etc. This information will provide the owners or operators of aircraft with identification of the person who released the aircraft for return to service after maintenance, preventive maintenance, or alterations and should indicate that the person is properly certificated and rated to do so.

In recognition of the fact that maintenance can be performed on component parts, the phrase is added to the list in § 43.9(a).

A provision is added stating that the signature of the person approving the aircraft, airframe, aircraft engine, propeller, appliance, or component part for return to service signifies only that the work described has been satisfactorily performed. This change makes it clear that the person making the approval is approving only the maintenance performed.

Under Part 135, certain aircraft are maintained under continucus airworthiness maintenance programs that are similar to programs approved under Parts 121 and 127. Section 43.9(b) is revised to allow Part 135 operators to use the recordkeeping procedures required of Part 121 and Part 127 operators.

Finally, § 43.9(c) excepts all aircraft inspections required by Part 91, Part 123, Part 125, and § 135.411(a) (1) from § 43.9, since requirements for these entries are contained in § 43.11.

One commenter suggests that § 43.9 be revised to include a requirement that "time in service" be made a part of the maintenance record and that the rule specify when the record entry must be made. The first suggestion is beyond the scope of this Notice. While § 43.9 will not specifically require recording of "time in service" by the person performing the work, § 91.173 already requires the owner to maintain this data. A correlation may be drawn between dated "time in service" entries and dated maintenance entries when the time in service entries are properly kept. The second recommendation, if included, would be redundant since § 43.5 requires the entry be made prior to approval for return to service.

Another commenter states the term "approved for return to service" should be substituted for "has been performed satisfactorily." The signature signifies approval for return to service and the use of the term "has been performed satisfactorily" is an additional certification as to performance in accordance with §§ 43.13 and 43.15. This commenter also suggests that legibility requirements be included in § 43.9. Since legibility is a practical necessity and entries which are not legible do not satisfy the purpose of § 43.9, such requirements have not been incorporated.

One commenter suggests that § 43.9(a) (4) be broken into two paragraphs to highlight the additional requirements when major repairs or alterations are involved. The suggestion is incorporated.

Another commenter states that the revisions to § 43.9 would prohibit much of the preventive maintenance presently accomplished under Part 121. Preventive maintenance as used in § 43.9 deals only with that maintenance which a pilot may do on an aircraft owned or operated by that pilot. It is not synonymous with the term as used in Part 121 and the change made to § 43.9 will not require changes to procedures used under Part 121.

Proposal 12-6. This change to § 43.11 adds the inspection recording requirements of § 91.217, Part 123, Part 125, and § 135.411(a)(1) to § 43.11. (See last paragraph of explanation for § 43.9, Proposal 12-5.) Additionally, it requires the person approving an item for return to service after inspection, to include the applicable kind of certificate held by that person and provides consistency between the requirements of § 43.11 and § 43.9.

The inclusion of the kind of certificate in maintenance record entries under § 43.11(a)(3) is explained under the explanation for § 43.9 (Proposal 12-5).

The change also requires that a list of discrepancies be provided to the owner or lessee when an aircraft is found unairworthy as a result of any inspection conducted under Part 91, Part 123, Part 125, or § 135.411(a)(1). Owners and lessees, under several inspection systems, are provided lists of discrepancies and use them to analyze previous inspections and recurring discrepancies. Owners and lessees having their aircraft inspected under the 100-hour inspection system should also be given this advantage, and a requirement for such lists in the 100-hour inspection is included.

Inspections required by § 135.419 are excluded since these approved inspection programs specify the means by which the operator will control the repair of defects found during inspections. Except for inclusion of the 100-hour inspections under these provisions, the rule is essentially unchanged.

For an explanation of the addition of "component parts" to the list of items set forth in § 43.11(c), see the explanation for § 43.9 (Proposal 12-5).

One commenter suggests that requirements be added in § 43.11 to include the rating held in all maintenance record entries and to establish legibility standards. The rule as amended contains a requirement for ratings and certificate numbers to be made a part of entries under § 43.11. Entries which are not legible may not be construed as satisfying § 43.11.

Another commenter suggests that the second time the phrase "in accordance with a progressive inspection" appears in § 43.11(a)(6) is redundant. The commenter is correct and the phrase is deleted.

One commenter objects to the disapproval provisions in § 43.11(a) stating that such entries are detrimental to future sales, prevent the owner from getting a second opinion, prevent continued operation of the aircraft if inspections are performed earlier than required, and prevent the pilot from operating with equipment inoperative.

When disapproval entries are made they must be followed by an entry showing correction of the item prior to operation. The FAA does not agree that a record showing discovery and proper correction of a discrepancy would devalue an aircraft. Neither would such entries prevent second opinions. If a second opinion is desired, the aircraft may be operated under a special flight authorization (ferry permit), another mechanic may be called in, or the local FAA inspectors may also be available. Further, any operation subsequent to the discovery of a discrepancy is presently prohibited by § 91.165.

This commenter also objects to reporting discrepancies to the FAA. The FAA's primary use of these discrepancy lists has been to prevent violations by aircraft owners and operators from inadvertent operation of their aircraft prior to correction of the discrepancies. Discrepancy lists have not been submitted to the FAA for the other inspection systems provided by Part 91 or Part 125. The number of violations under these other inspection systems is not significantly greater than experienced with the annual inspection system. Therefore, upon further consideration and in response to comments, the proposed requirement to submit discrepancy lists to the FAA is not incorporated in the rule.

Proposal 12-7. Although § 43.12 presently prohibits fraudulent entries in maintenance records, fraud or proof of fraud is frequently absent. This change to § 43.12 provides a prohibition against intentionally false entries in required maintenance records and reports similar to the prohibitions found in §§ 61.59(a)(1) and 65.20(a)(1) and provides a uniform standard in the application of the regulations. Aircraft owners and operators rely on the accuracy of these records in meeting their airworthiness

responsibilities and as a detailed record of maintenance performed on their aircraft. Note that Title 18 U.S.C. Section 1001 provides severe sanctions in the form of a $10,000 fine or imprisonment of not more than 5 years, or both, for anyone who knowingly makes such fraudulent or false entries.

Proposal 12-8. The inspection requirements of § 91.217 through § 91.219 are moved to § 91.169, and the additional performance rules for inspections are consolidated in § 43.15. The need for § 43.13(d), which provided performance rules for inspections conducted under § 91.217, no longer exists, and § 43.13(d) is deleted.

Section 43.13(c) is revised to use language consistent with § 43.3 and to make it compatible with the terminology of Parts 121, 127, and 135 introduced by SFAR 38. The changes are not substantive as to requirements or applicability.

Proposal 12-9. This change extends the applicability of §§ 43.15(a) and (b) to all inspections instead of only 100-hour, annual, and progressive inspections.

It is important that all inspections performed provide a determination that the aircraft inspected meets all applicable airworthiness requirements. It is also important that the rotorcraft systems, defined in §§ 43.15(b) (1) through (4), be inspected in accordance with the maintenance manual of the manufacturer concerned. Rotorcraft inspected in accordance with Part 121 or Part 127 are exempt from the requirements of § 43.15(b). The reference to inspections required by Part 135 is added to § 43.15(a) since § 135.411(a) (1) requires that aircraft type certificated for a passenger seating configuration of nine seats or less, excluding any pilot seat, be maintained under Part 91, Part 43, and certain sections of Part 135.

One commenter states that § 43.15(b) could be interpreted to mean that each time any kind of inspection is accomplished on a helicopter the items listed in §§ 43.15(b) (1), (2), (3) and (4) must be inspected and thus, result in redundant inspection. In response to this comment, the language has been clarified. The same commenter states that Part 135 certificate holders operating helicopters for 10 or more passengers should be afforded the same privileges as Part 121 and Part 127 operators. The language change affords such privileges and is consistent with Part 135 requirements. On further consideration, language has been added to that proposed as § 43.17(a) to make § 43.13(a) consistent with § 43.11(a) (7). The language makes it clear that instructions and procedures contained in inspection programs provided for under Parts 123, 125, 135, and § 91.169(e) must be followed conducting those inspections.

Proposal 12-10. This amendment to § 43.17 allows certain Canadians, as defined in § 43.17(a), to perform any inspection, except an annual inspection, required by amended § 91.169 of this chapter. The previous rule allowed Canadians to perform only the 100-hour inspection. These changes permit owners and operators of all types of U.S.-registered aircraft the privilege of having work accomplished while the aircraft are in Canada. However, only U.S. certificated mechanics with inspection authorizations who comply with §§ 65.91 through 65.95 may perform annual inspections.

Proposal 12-11. This amendment to Appendix A of Part 43 changes the paragraph on preventive maintenance to explicitly state that preventive maintenance is limited to the work listed, provided it does not involve complex assembly operations. Additional items have also been included.

A number of commenters suggest that the term "small fabric repairs" would be subject to abuse and recommend more specific language. A parenthetical insert is added to the sentence directing the owner/operator to the balloon manufacturer's instructions regarding the specific balloon repair contemplated.

One commenter points out that the word "gondola" is not used in Part 31, which instead employs the term "basket." Accordingly, the term, "basket" has been substituted for gondola in items (9) and (28).

A number of commenters state that the inclusion of burners in item (28) would appropriately recognize what has been standard practice in the ground transport of balloons. Inclusion of burners would not be detrimental and this change is made.

One commenter objects to preventive maintenance being limited to only those items listed under Appendix A of Part 43. The contention is that this will unnecessarily restrict

preventive maintenance in the case of Part 121 certificate holders. The term "preventive maintenance," as used in Appendix A, refers to only that maintenance which may be accomplished by a pilot under § 43.3(g). The term "preventive maintenance" as used in Part 121 is unchanged.

One commenter recommends that item (24) be broken into two items, separating replacement of lead acid and nickle cadmium batteries into two categories, and limiting service to lead acid type batteries. The FAA does not agree since there is no demonstrated problem with the present servicing rule. The phrase "checking fluid levels and specific gravity" has been replaced by "servicing" to make the item compatible with all battery types.

Proposal 12–12. This amendment adds a new paragraph (c) to Appendix E of Part 43 which provides a total system integration test requirement which will insure that altitude reporting equipment and ATC transponders perform their intended functions when integrated in an airplane as a system.

The paragraph, as proposed in Notice 80–22, incorporated part of Proposal No. 67 of the Operations Review which was submitted by the Air Transport Association (ATA). It was proposed in part that, in addition to the 23 test points appearing in Table 1 of Appendix E of Part 43, two additional test points, 1,100 feet and 1,800 feet, be added. It was explained that this would insure proper function of the automatic pressure altitude reporting equipment and freedom from latent defects which would otherwise go undetected. The explanation also indicated that this proposal would impose a minimum burden on the users since tests could be conducted simultaneously with existing altimeter tests and using the same personnel and test equipment.

While the ATA supports the proposal as an improvement over the existing regulation, it points out that the proposal does not include their recommendation that the transition points for both the "on" and "off" position for each output bit (channel) be checked in both increasing and decreasing altitude and that, at transition, the displayed pressure altitude be within ±75 feet of the nominal pressure altitude for that transition point.

The ATA also comments that one airline suggests there is no need to test the altimeter and encoder at all of the points specified in Appendix E. The airline suggests that tests of each altitude code segment of the encoder—2300, 2500, 3800, 4300, 4800, 6800, 14800, and 30800 are sufficient to ensure proper operation of each altitude code segment of the encoder.

Another commenter questions requiring a check at 23 points each time an altimeter or transponder is replaced and suggests instead, that a check at 2 or 3 points would provide the necessary accuracy assurance.

A third commenter states that based on their experience the specified check at 23 different altitudes is excessive. The commenter states that they have been using 12 points and consider even that excessive.

In consideration of the comments, the FAA has amended proposed Appendix E, paragraph (c), to require that only a sufficient number of test points be checked to ensure that the altitude reporting equipment and ATC transponder perform their intended functions through their entire range while both ascending and descending.

A number of commenters speak to the correspondence value of 125 feet. This value is based on the requirement of § 91.36(b) and its reasonable achievability when a single source (aneroid) is used to feed the pilot's display and the pressure altitude digitizer. The value represents three elements: a variation of ±50 feet which may exist between the pressure information from the aneroid and the information actually digitized; an uncertainty factor of ±50 feet which can exist because of reporting in 100-foot increments; and, in installations where the altitude reporting equipment has an optional pilot's display, the difference of 25 feet allowed between aneroid output feeding the digitizer and the pilot's display.

The achievement of correspondence is difficult when separate aneroids are used for the pilot's altimeter and the digitizer input. Careful matching of aneroids is necessary to achieve a correspondence value of 125 feet or less.

Proposal 12-13. This amendment makes § 91.161 more specific regarding the continuous airworthiness maintenance programs of Part 135 by reference to § 135.411(a)(2). In addition, even though progressive inspections are moved to § 91.169 from § 91.171, § 91.171 is still referenced since the new § 91.171 deals with altimeters and altitude reporting equipment tests and inspections.

Proposal 12-14. This amendment to § 91.165 removes the reference to aircraft inspected under Subpart D since those inspection requirements are transferred to the presently referenced § 91.169. The provisions of § 91.177, concerning ATC transponder tests and inspections are transferred to § 91.172, and reference to § 91.172 is added as an aircraft inspection procedure. Also, to conform this section to other sections in this chapter, the term "approved for return to service" is substituted for the term "release to service." One commenter suggests that the words "aircraft and" following "appropriate entries in" in the second sentence be deleted. Deletion of these words would leave the appropriate location of aircraft inspection entries unspecified. This is inappropriate and the suggestion is not incorporated.

Proposal 12-15. This amendment to § 91.167 changes the heading and rule to set forth specific conditions which must be met after maintenance, preventive maintenance, rebuilding, or alterations have been performed, and before the aircraft is operated. The word "repairs" is deleted as redundant since the word "maintenance", by definition, includes repairs. Because § 43.5 is amended to make it clear that "approval for return to service" does not involve operation of the aircraft, § 91.167(a) is changed to prohibit any person from operating an aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless it has been approved for return to service by a person authorized under § 43.7 of this chapter and the maintenance record entries required by § 43.9 or § 43.11 have been made. That is, the aircraft must be approved for return to service prior to any operation, including test flights provided for in § 91.167(b). See Proposal 12-3 for further explanation.

One commenter states that a requirement to log the flight required by § 91.167(b) is of no value unless the results of the operational check are indicated. Although the language is not specific, a requirement that the operational check results be part of the entry is clearly implied. Therefore, the section is unchanged.

One commenter suggests that the language change to § 91.167 would introduce a question as to what part of repairs, alterations, etc., would require flight tests. The commenter states that the mere fact that the change was made would raise the question. Sections 91.167(a), (a)(1), and (a)(2) were added for the reasons stated in the second paragraph of this explanation. While § 91.167(b) has the word "maintained" substituted for "repair" because it is a defined term, the FAA does not intend to require reevaluation of existing programs or procedures. Rather, it restates when flight tests are required without change to those requirements.

Proposal 12-16. This amendment to § 91.169 transfers the inspection and maintenance requirements of §§ 91.171, 91.217, and 91.219 to § 91.169, consolidating the inspection requirements of Part 91 in one section. Transferring the inspection requirements of § 91.217 to § 91.169 removes the provisions from the applicability of § 91.181, which did not provide for use of a § 91.217 inspection program when a U.S.-registered airplane is leased to a foreign operator engaged in common carriage. In recent years, the FAA has frequently issued exemptions to foreign operators engaged in common carriage to allow use of a § 91.217 inspection program. Transferring the inspection requirements into Subpart C permits the use of the continuous inspection program by these foreign operators and exemptions will no longer be required. These changes do not affect aircraft subject to Part 125. This action is consistent with Executive Order 12291 and the FAA's continuing effort to reduce unnecessary administrative burdens on the public.

Additionally, § 91.172 allows the Administrator to require revision of any inspection program approved under § 91.169(f)(5). This provides a regulatory procedure for requiring changes in programs when needed to ensure an adequate level of safety. See also the discussion of Proposal 12-19.

The reporting requirements of §§ 91.217(c) and (d) were established in 1972 with adoption of Subpart D of Part 91. These reporting requirements have proven cumbersome and ineffective and are replaced by § 91.169(f) which substitutes a maintenance record entry identifying the inspection option selected under § 91.169 and the name and address of the person responsible for scheduling the required inspections. This is consistent with the FAA's continuing effort to reduce reporting requirements and is in accordance with Executive Order 12291 and the Department of Transportation regulatory policies and procedures to reduce unnecessary administrative burdens on the public.

Section 91.169(h) provides that if an owner or operator changes inspection programs, the time in service, calendar time, or cycles of operation accumulated under the old program must be applied in determining inspection due times under the new program. This prevents operation under one program until the major inspection of an item is due, then changing programs and starting at zero inspection time to delay or avoid a major inspection of the item.

One commenter points out that Part 125 should be included in § 91.169(c)(2) as aircraft not subject to the section. The FAA agrees. Part 125 was not a rule when the proposal for § 91.169 was published in the *Federal Register* and the number 125 is added following "Part 123" in § 91.169(c)(2).

One commenter remarks on the slight change in terminology in the proposal when dealing with "turbojet multi-engine" airplanes and suggests that since no change was intended, identical language be used. In response, the proposed terminology change is not adopted.

Proposal 12-17. This amendment to § 91.170 redesignated it as § 91.171 and requires tests and inspections, within the preceding 24-calendar months, of: pressure altitude reporting equipment; tests and inspections whenever such systems are opened and closed; and data correspondence checks between altitude and reporting transponder each time the altimeter or the encoding function has been subjected to maintenance where data correspondence error could be introduced.

Accurate altitude reporting is essential to safety. Previous regulations required accuracy checks upon initial installation of the system, but there was no provision for checks following maintenance which could affect the integrity of the system. Calibration or maintenance functions on the altimeter or the reporting equipment could lead to improper data correspondence. Therefore, this equipment should be checked for accuracy any time an error could be introduced.

Similarly, the static pressure system could be adversely affected following an opening of the system. Accordingly, this amendment requires test and inspection of the static pressure system after any opening and closing. This amendment also provides that altimeters and transponders approved under Technical Standard Orders are considered to be tested and inspected as of the date of their manufacture. However, even if the altimeter (or transponder) has been manufactured and bench checked within the preceding 24-calendar months, the integrated system would require test and inspection at the time of installation and, thereafter, as specified in § 91.171(a).

A number of commenters point out that the term "any opening" as it appears in § 91.171(a)(2) could be interpreted to require a static system test after opening system drain valves, alternate static source valves, or when a system is opened to attach test equipment. In response to these comments, an exception is included regarding these valves. No exception is made for opening the lines to attach test equipment. It would be illogical to require a system test anytime a system is opened and not require a test when opened to attach test equipment. The same or similar type system fittings are involved in both instances and would, therefore, be equally subject to leakage.

A number of commenters state that compliance with all of Appendix E of Part 43 is not required when a static system is opened or closed and that only paragraph (a) of the Appendix should be required. The rule is made specific in this regard.

One commenter suggests that reference to ATC transponder equipment in § 91.171(a)(3) be deleted since a properly maintained transponder will not effect altimeter-encoder correlation and retention of this language would require unnecessary testing. The phrase, "which may affect data correspondence" adequately limits the instances in which transponder maintenance will require system tests. The reference is, therefore, retained. Except for the changes noted, the rule is adopted as proposed.

Proposal 12-18. The progressive inspection requirements of § 91.171 are transferred to § 91.169. (See Proposal 12-16, § 91.169.) This amendment also transfers the ATC transponder tests and inspection requirements of § 91.177 to new § 91.172 in order to consolidate all of the inspection requirements of Part 91 into consecutively numbered sections. This is consistent with Executive Order 12291. The phrase "after January 1, 1976" has been removed from former § 91.177 (now § 91.172(a)), and "must" is substituted for "may" in § 91.172(c).

A number of commenters state that Part 135 certificate holders should be granted the same privileges regarding maintenance as Parts 121 and 127 certificate holders. Inasmuch as Part 135 certificate holders are authorized, under certain circumstances, to accomplish maintenance on aircraft, aircraft engines, propellers and appliances, they should be authorized to conduct these tests. Section 91.172(c)(2) is changed to include this privilege. The language is also changed to be consistent with other sections of Parts 91 and 43.

One commenter suggests that § 91.172 be added to the list of sections not applicable to Part 121 operators. This may be desirable, however, it is beyond the scope of Notice No. 80-22 and should be given consideration in a separate action.

Proposal 12-19. Section 91.170(a) establishes a procedure by which the Administrator may require revision of an inspection program approved under § 91.169(f)(5) as operational experience is gained. Inspection programs approved under §§ 91.169(f)(1) through (f)(4) are programs approved under Parts 121, 123, and 135, or recommended by the manufacturer. The FAA's significant experience with these programs does not indicate a need to revise them on an individual basis. They are continually revised by the holders as experience requires. Section 91.169(f)(5), on the other hand, permits the registered owner or operator of an aircraft to have an individual inspection program approved. Neither the owners/operators, nor the FAA has experience with these programs. Accordingly, revision may be necessary as operating experience is gained. This procedure provides for this revision.

Sections 91.170(b), (c), and (d) provide procedures for seeking reconsideration of any notice of required revision by the Administrator to an operator having an aircraft inspection program approved under § 91.169(f)(5). These procedures are consistent with those provided by §§ 121.373 and 135.431.

One commenter states that while the rule provides for an appeal from a notification to change a program, this is not realistic relief since the appeal must be made to the Flight Standards District Office (which is usually the office requesting the change). As the commenter states, the rule requires the petition to be submitted to the office making the request. However, internal directives require that it be forwarded to a higher level for disposition and the fears of the commenter are unfounded.

Proposal 12-20. Previous § 91.173(a) required each registered owner or operator to keep a list of the major alterations made to each airframe, engine, propeller, rotor, and appliance. However, such lists do not contain sufficient details of alterations to provide for continued maintenance and inspection subsequent to the alteration. This amendment requires that copies of the forms prescribed by § 43.9 for major alterations, which contain the necessary details, be made a part of the aircraft records.

One commenter correctly points out that the reference to § 91.177 in proposed § 91.173(a) is in error due to redesignation of § 91.177 and § 91.171. Accordingly, § 91.173 has been editorially amended for consistency with these amendments.

Similarly, another commenter correctly points out that the reference to § 43.9 in proposed § 91.173(b) (3) is in error and this is corrected to read § 43.11.

Proposal 12-21. See the explanation for 12-18 (§ 91.171).

Proposal 12-22. This amendment changes § 91.181(a) to refer to § 91.169 since the requirements of §§ 91.217, 91.219 and 91.169 are consolidated as § 91.169. Part 135 specifies inspection requirements for all aircraft operated thereunder and reference to Part 135 here is redundant and deleted.

This amendment also replaces the word "subpart," in the last sentence of § 91.181(a) with the word "part." When issuing Amendment 91-101 (37 FR 14758; July 25, 1972) the FAA stated "there is no demonstrated need at this time to require small turbopropeller-powered multiengine airplanes to be operated under the rules of Subpart D." The FAA further stated this decision "does not apply to the inspection program requirements which should be required for all turbine-powered multiengine airplanes (turbopropeller and turbojet powered airplanes) as proposed in the Notice regardless of whether they are large or small." Section 91.181 of Subpart D provides that small turbopropeller-powered multiengine airplanes do not have to be operated under that subpart. However, the regulation provides that these airplanes are to be inspected in accordance with §§ 91.217 and 91.219 of Subpart D, but qualifies it by adding "when they are operated under this subpart." This qualification is incorrect since, except as otherwise provided in Part 135, they are to be inspected under this subpart whether or not they are operated under it. Therefore, the word "subpart" is changed to "part" to correct the error.

Proposal 12-23. The inspection provisions of § 91.217 have been transferred to § 91.169. See Proposal 12-16 for explanation.

Proposal 12-24. The inspection provisions of § 91.219 are transferred to § 91.169. See Proposal 12-16 for explanation.

Economic Evaluation

The rule changes reviewed above are either relieving, clarifying or they greatly improve the value of maintenance records to aircraft owners or prospective aircraft owners. Each change is covered in the following summary.

Proposal 12-1—Records of Overhaul and Rebuilding. This amendment establishes conditions which must be met before the terms "overhaul" and "rebuilt" may be used in maintenance records. There is no cost associated with this rule, as it sets no new standard or requirement. There is a nonquantifiable benefit—protection of purchasers of aircraft equipment or services by more fully documenting aircraft, engine, propeller or appliance maintenance histories.

Proposal 12-2—Persons Authorized to Perform Maintenance. This amendment makes three changes to § 43.3: one which references other regulations; one which is clearly relieving; and a third which clearly states that only certificated persons may conduct inspections.

First, a change to § 43.3(a) provides consistency between this rule and § 43.17.

Second, a change to § 43.3(h) extends the privileges of manufacturers by allowing them to perform any inspection required by Part 91 or Part 125, instead of only 100-hour, annual, and progressive inspections. This change is clearly relieving.

Finally, a change to § 43.3(d) prevents noncertificated persons, working under the supervision of the holder of a mechanic or repairman certificate, from conducting any inspection required under Parts 91 and 125. Air carrier and manufacturers' association comments related to this amendment argue an economic need associated with continuing certain work with noncertificated persons. These comments have been basically accommodated by a change in the applicability of the rule. No details as to the economic impact of these few situations were provided by the commenters.

There may be a few instances where inspections covered by regulations have been done by noncertificated persons under the supervision of a certificated mechanic, but the real impact of this change is *de minimis* since in present practice the majority of these inspections are currently conducted by certificated persons.

Proposal 12-3—Return to Service After Maintenance. This amendment clarifies the difference between "approve for return to service" and "return to service." This clarification involves no cost, and sets no new standard.

Proposal 12-4—Persons Authorized to Approve Aircraft etc. for Return to Service. This amendment involves several clarifications to existing § 43.7, plus an added recordkeeping requirement for those persons who wish to perform preventive maintenance on private aircraft they own or operate.

The clarifications involve referring to § 43.17, which concerns mechanical work done by Canadians, and the addition of component parts in the list of items which can be returned to service by the various parties subject to this amendment. These are no-cost clarifications and do not set any new standard.

This amendment requires that records be kept for preventive maintenance, as well as maintenance, rebuilding and alteration. This is dealt with in Proposal 12-5.

Proposal 12-5—Maintenance Records. This amendment adds to maintenance reporting requirements in two ways. First, it requires the person approving maintenance for return to service to indicate, in the maintenance record, the kind of certificate that person holds. Second, it adds preventive maintenance to the types of maintenance requiring formal documentation in the relevant maintenance record.

Both of these changes, while they add to recordkeeping, involve *de minimis* costs which are well outweighed by benefits.

Present § 43.9 specifies that when a person performs maintenance, that person must enter a description of the work performed, the date of completion of the work, the name of the person performing the work, the signature of the person approving for return to service and his or her certificate number. This amendment requires a certificated mechanic to note on the record the type of certificate he or she has. This should take less than 5 seconds and is truly a minor cost.

While there is no current requirement for pilot/owners who do preventive maintenance to enter such maintenance in the maintenance record, most pilot/owners now enter such information in the maintenance record of the aircraft. It will take less than a minute to add an item to the maintenance record, and it is, therefore, a minor cost. While there is not sufficient information to estimate the cost, FAA believes that any moderate cost is balanced by the benefit of a more accurate record of maintenance performed on aircraft. The absence of comments on this aspect of the amendment supports the conclusion that its cost impact is minor.

These changes, and a similar one in Proposal 12-16, involve minor additions to the recordkeeping process which are balanced by general benefits associated with the improved equipment record that results from the minor changes. While the benefits are real, they cannot be directly quantified.

There are identifiable benefits, though they are not quantifiable. In assessing the aircraft's maintenance record, a prospective purchaser cannot always determine that appropriate persons always performed the maintenance. This situation is corrected by the amendment. Also, accidents could be caused by failure to perform preventive maintenance properly, and without a requirement to record preventive maintenance, investigative authorities might not discover the true causes of an accident. Likewise, without a complete record of maintenance including preventive maintenance, the causes of accidents may be improperly placed.

Proposal 12-6—Inspection Recording Requirements. This amendment accomplishes three basic things. First, it acts to clarify the inspection recording requirements of § 43.11. Second, it requires that the person approving an item for return to service indicate in the maintenance record the applicable kind of certificate held by that person. Third, a list of

discrepancies must be provided to the owner or lessee when an aircraft is found unairworthy under an inspection required by Part 91.

The change to inspection recording requirements involves the addition of "component part" to the list of items for which entries must be made in the maintenance record after maintenance, etc. This change does not cause any party to incur a new cost, since it only adds one item to a list of items currently required to be entered in the maintenance record.

The requirement to show the type of certificate held by the person approving an item for return to service is the same as the requirement in Proposal 12-5 and involves only a minor cost.

Except for 100-hour inspections, present rules require that the owner or lessee be provided a signed and dated copy of a list of discrepancies, if the aircraft is not approved for return to service. This allows the owner of such an aircraft to "shop around" for the required part or service required to correct the discrepancy, and immediately have the aircraft returned to service after a "sign off" by the person performing the service or installing the required part. The owner whose aircraft fails a 100-hour inspection has no list of discrepancies, and, if he wishes to shop around for the required parts or service, he may have to have the aircraft fully inspected again before it can be returned to service. Therefore, allowing the same system for 100-hour and other inspections provides a consumer protection benefit to owners.

In addition, the final rule eliminates a requirement to provide the Administrator with copies of lists of discrepancies for inspections conducted in accordance with § 91.169. This change is clearly relieving.

Proposal 12-7—Intentionally False Maintenance Entries. This change to § 43.12 changes the legal criteria for prosecution of persons who make false statements in maintenance records.

This amendment provides an unquantifiable benefit to society since it makes engaging in such illegal practices more likely to result in enforcement action, and should, therefore, decrease the frequency of such activity.

Proposal 12-8—Inspection Requirements Moved. This amendment moves certain inspection requirements within the FAR, and deletes a present requirement. The changes are not substantive as to requirements or applicability, and thus is a no-cost modification.

Proposal 12-9—Inspection Required. This amendment involves no new requirements for inspection. The amendment provides references to inspection requirements under Parts 91, 123, 125 and 135. Since there are no new requirements, this amendment is a no-cost clarification of current regulations.

Proposal 12-10—Canadian Inspections. This amendment relaxes regulations concerning who may perform certain aircraft inspections. The amendment involves no new requirements, and, therefore, no costs. It improves competition and relaxes regulation, therefore, providing a positive though unquantifiable benefit.

Proposal 12-11—Preventive Maintenance. This amendment expands the list of items defined as preventive maintenance. In particular, it updates the list to include balloon preventive maintenance, on which previous regulations were silent. The proposal involves no new requirements, and, therefore, no costs.

Proposals 12-12, 12-17, 12-18—Altimeter Systems Tests (Associated deletions 12-21, 12-23, and 12-24). These amendments involve a common aircraft system, the altimeter/encoder/transponder system. The function of these instruments is to determine the altitude at which the aircraft is operating, and to encode this altitude into a radio signal and transmit a signal to the ground properly identifying the aircraft altitude. Proper functioning of the altimeter/transponder system is of critical importance to airspace control and aircraft separation.

There are three major components to the altimeter/transponder system, and several secondary components. The three major components are the altimeter, the digitizer or altitude encoder, and the transponder. The secondary components are the static system,

cables connecting altimeters, encoders, transponders, and the antenna which transmits the radio signal with the encoded altitude.

Both the altimeter and the transponder are required to be checked at least each 24 months. The tests required are spelled out in Appendix E and Appendix F of Part 43. The present regulations do not spell out specific standards for tests of the system, and while these proposals specify such a test, this is not really a new requirement.

The original proposal (Notice No. 80–22) would have required full Appendix E and F tests after maintenance or repair of the altimeter or transponder. This requirement was eliminated in response to comments and after review of the proposal in light of Executive Order 12291. The amendment adopted will require only a modified test of the equipment as installed. This is a minimum test which must presently be performed before an aircraft can be returned to service after repair or maintenance of the altimeter or transponder. The test is simply a formalization of the Part 43 requirement that, after maintenance and installation of aircraft systems, the parts must be tested to determine whether they are capable of performing their intended function (§ 43.13(b)). The test also restates an already existing Part 91 regulation relating to tests of installed altimeter transponders (§ 91.36).

Proposal 12–13—Applicability of § 91.161. This amendment involves only internal consistency within the FAR, and clarifies the applicability of certain sections of Part 91 to aircraft maintained in accordance with a continuous airworthiness maintenance program. There is no new requirement, and the proposal is a no-cost editorial clarification of the rule required by other changes.

Proposal 12–14—Maintenance Required. This amendment changes references within the FAR and clarifies the disposition of maintenance for aircraft which are maintained and inspected under provisions of §§ 91.169, 91.171, and 91.172. This is not a new requirement, and the amendment is editorial and involves no cost.

Proposal 12–15—Operation after Maintenance. This amendment changes § 91.167 to prohibit any person from operating an aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless it has been approved for return to service by an authorized person, and the proper maintenance record entries have been made in the aircraft records. There is no substantive change implied by the amendment, and no new costs are incurred.

Proposal 12–16—Inspection and Maintenance Requirements. This amendment involves a consolidation of several inspection and maintenance requirements into one section of Part 91. It also provides relief to foreign operators who operate leased U.S.-registered airplanes by allowing them to use a continuous inspection program without the need for exemptions.

The amendment is clarifying and relieving, and involves no new requirements.

Proposal 12–19—Procedures for Revision of an Inspection Program. This amendment is directly related to Proposal 12–16, which consolidates a number of inspection options for operators in § 91.169. One of those options, § 91.169(f)(5), allows the owner or operator of an aircraft to establish his own individual inspection program, which must be approved by the Administrator.

The FAA has found need to require changes to individually tailored inspection programs as experience is gained, to ensure safety of operations. This amendment gives the Administrator the authority to require any such changes and sets up a procedure by which operators can petition the Administrator for reconsideration of changes required.

Proposal 12–20—Details of Maintenance Records. This amendment modifies § 91.173 in order to correct certain references and in order to require that the maintenance records of an aircraft include certain information for each major alteration to the airframe, engines, rotors, propellers and appliances. This information is already provided to aircraft owners, and most owners incorporate the information into maintenance records. It requires no new work or reporting and is, therefore, a no-cost modification. No substantive comments were received concerning this proposal to modify aircraft records.

Proposal 12-22—Changes to § 91.181. This amendment makes several changes to § 91.181 to correct a number of references to conform to the previously discussed proposals. No substantive change results from adoption of this amendment.

Amendment to § 43.1 and § 43.16

Amendment 121-165, effective October 16, 1980, changed Part 121 (by adding § 121.153) to permit U.S. air carriers to use foreign-registered aircraft, subject to certain conditions and limitations. Similar changes were made to Parts 127 and 135. These changes implemented the International Air Transportation Competition Act of 1979 (Pub. L. 96-192). This amendment makes § 43.1 compatible to Parts 121, 127, and 135 and other amendments to Part 43 by extending maintenance privileges and procedures to these foreign-registered aircraft when they are used under the provisions of Parts 121, 127, and 135. Notice 80-22 did not propose amendment of § 43.16 which became effective September 11, 1980, subsequent to the Notice. However, since the provisions of § 91.217 are now lodged in § 91.169, the reference in § 43.16 to § 91.217(e) is changed to read "§ 91.169(e)."

These amendments are clarifying and editorial in nature and do not impose a burden on the public, notice and public procedure are unnecessary, and this change is adopted as noted.

Paperwork Reduction Act

Information collection requirements contained in this regulation for §§ 43.9 and 43.11 have been approved by the Office of Management and Budget under the provisions of the Paperwork Reduction Act of 1980 (P.L. 96-511) and have been assigned OMB control number 2120-0020. Information collection requirements for §§ 91.167, 91.169, and 91.173 have been assigned OMB control number 2120-0005.

Adoption of the Amendments

Accordingly, Parts 43 and 91 of the Federal Aviation Regulations (14 CFR Parts 43 and 91) are amended effective October 15, 1982.

Sections 313, 314, 601 through 610 of the Federal Aviation Act of 1958, (49 U.S.C. 1354, 1355, and 1421 through 1430); Section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

NOTE: These amendments are generally relieving, clarifying, or editorial in nature and will have minimal impact. Where additional requirements are imposed, their imposition results in increased value of maintenance records for aircraft owners or increased reliability of critical aircraft systems. I certify that the amendment will not have a significant economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. The Federal Aviation Administration has determined that this document involves a regulation which is not a major rule under Executive Order 12291 or a significant regulation under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). A copy of the final evaluation prepared for this action is contained in the regulatory docket. A copy of it may be obtained by contacting the person identified under the caption "FOR FURTHER INFORMATION CONTACT."

Amendment 43-24
Anti-Misfueling: Tank Filler Opening Adapters
Adopted: October 3, 1984 Effective: November 7, 1984

(Published in 49 FR 44802, November 7, 1984)

SUMMARY: This amendment to Appendix A of Part 43 of the Federal Aviation Regulations (FAR) classifies the installation of fuel tank filler opening adapters as preventive maintenance when certain conditions are met. Several accidents have occurred as the result of misfueling aircraft and have resulted in numerous deaths and injuries. Installation of these adapters will significantly reduce accidents due to fueling aircraft which require gasoline with jet fuels.

Comments must be received on or before December 7, 1984.

ADDRESSES: Mail or deliver comments on this rule in duplicate to: Federal Aviation Administration, Office of the Chief Counsel; Attention: Rules Docket (AGC-204), Docket No. 24309, Room 916, 800 Independence Ave., SW., Washington, D.C. 20591. Comments may be examined in Rules Docket, weekdays except Federal Holidays, between 8:30 a.m. and 5:00 p.m.

FOR FURTHER INFORMATION CONTACT: Charles W. Schaffer, General Aviation and Commercial Branch, Aircraft Maintenance Division, Office of Airworthiness, Federal Aviation Administration, 800 Independence Ave., SW., Washington, D.C. 20591, Telephone (202) 426-8204.

SUPPLEMENTARY INFORMATION:

BACKGROUND:

A number of industry organizations including the General Aviation Manufacturer's Association (GAMA), the National Air Transportation Association (NATA), the United States Aircraft Insurance Group (USAIG), and various aircraft manufacturers and governmental organizations are concerned with the problem of misfueling aircraft which require gasoline with jet fuel. The results of such misfueling have been catastrophic as attested by several highly publicized accidents which have resulted in numerous deaths and injuries.

As a result, a fuel tank filler opening of reduced inside diameter has been developed for gasoline fueled aircraft to be used in conjunction with oversized fuel dispensing nozzles on jet fuel dispensing equipment. The inability to insert the jet fuel nozzle in the gasoline filler opening should significantly mitigate accidents caused by this type of misfueling. The fuel tank filler opening adapters are simple in design and may be installed without special skills. Those persons authorized under § 43.3(g) and 43.7(f) of the FAR to perform preventive maintenance and approve it for return to service could make the installations without derogating safety if such installations were classified as preventive maintenance.

NEED FOR IMMEDIATE ADOPTION:

This revision, by classifying the installation of fuel tank filler opening adapters as preventive maintenance, will provide persons with a significant opportunity to voluntarily increase safety, in the shortest time, at a minimal cost and, since it is voluntary, no regulatory burden.

New aircraft will be equipped with reduced diameter filler openings prior to delivery and retrofit of existing aircraft is voluntary. Installation may be made in a matter of a few minutes at a cost of approximately $38 per opening. The cost in many instances is being offset voluntarily by subsidies from the aircraft insurers. The FAA recognizes a need to reduce the number of accidents resulting from misfueling aircraft and this amendment, which imposes no burden on any person and is minor in nature, will help achieve that goal. Therefore, I find that notice and public procedure are unnecessary and contrary to the

public interest. In addition, I find that good cause exists for making this amendment effective in fewer than 30 days. However, interested persons are invited to submit such comments as they may desire regarding this amendment. Communications should identify the docket number and be submitted in duplicate to the address specified above. All communications received on or before the closing date for comments will be considered by the Administrator and this amendment may be changed in response to comments received. All comments received will be available, in the rules docket for examination by interested persons before and after the closing date for comments.

CONCLUSION:

The adoption of this rule permits the owners of aircraft to quickly reduce the probability of a misfueling accident in their aircraft at minimal cost and no regulatory burden. Therefore, the FAA has determined that this amendment is not a major rule under Executive Order 12291 or significant under the Department of Transportation Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). For the reasons stated above it has been determined also that the anticipated economic impact is so minimal that no regulatory evaluation is necessary. In addition, since this amendment adds one item to the list of permissable preventive maintenance activities to effectuate a voluntary anti-misfueling safety program, rather than imposing any new burden or requirement, I certify that this regulation will not have a significant economic impact on a substantial number of small entities.

ADOPTION OF THE AMENDMENT:

Accordingly, Part 43 of the Federal Aviation Regulations (14 CFR Part 43) is amended effective November 7, 1984.

(SECS. 313, 601 through 610, and 1102, Federal Aviation Act of 1958 as amended (49 U.S.C. 1354, 1421 through 1430 and 1502); 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 21, 1983; and 14 CFR 11.45).

Amendment 43-25

Rotorcraft Regulatory Review Program Amendment No. 5: Operations and Maintenance

Adopted: October 31, 1986 **Effective: January 6, 1987**

(Published in 51 FR 40692, November 7, 1986)

SUMMARY: This rule amends and updates the operations and maintenance requirements pertaining to rotorcraft and establishes a new Class D rotorcraft-load combination. Amendments affect certain sections of Parts 1, 43, 45, 61, 91, 133, and 135 of the Federal Aviation Regulations that apply to rotorcraft.

FOR FURTHER INFORMATION CONTACT:

Marian Clemens or Thomas Stuckey, Project Development Branch (AFS-850), General Aviation and Commercial Division, Office of Flight Standards, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591; Telephone (202) 267-8150.

SUPPLEMENTARY INFORMATION:

Background

On January 5, 1979, the Federal Aviation Administration (FAA) gave notice of its Rotorcraft Regulatory Review Program and invited all interested persons to submit proposals for consideration during a forthcoming Rotorcraft Regulatory Review Conference (Notice 79-1; 43 FR 23925). Such a Rotorcraft Regulatory Review Conference was held on December 10-14, 1979, in New Orleans, Louisiana. A subsequent Rotorcraft regulatory Review Meeting was held August 16-20, 1980, in Washington, D.C.

After the conference and meeting, the FAA developed plans to publish a series of five notices of proposed rulemaking. The first notice included proposals dealing with the applicability sections of Parts 27 and 29 of the Federal Aviation Regulations (FAR), plus Instrument Flight Rules (IFR) certification and icing criteria. These were subsequently adopted as a final rule effective March 2, 1983 (48 FR 4374; January 31, 1983). The second notice addressed airworthiness standards for type certification of normal and transport category rotorcraft. Amendments based upon that notice were subsequently published in the *Federal Register* on November 6, 1984 (49 FR 44422), and were effective December 6, 1984. The third notice, which covers powerplant proposals, and the fourth notice, covering airframe proposals, are still in preparation.

These amendments, the fifth in the series, are based on Notice of Proposed Rulemaking (NPRM) No. 85-8 published in the *Federal Register* on March 13, 1985 (50 FR 10144). All interested persons have been given an opportunity to participate in the making of these amendments, and due consideration has been given to all matters presented.

Discussion of Comments

The public comments are discussed below on a section by section basis. The references following each discussion relate to proposals and committees associated with the Regulatory Review Conference.

Section 1.1 General Definitions.

The proposal to amend §1.1 revising definition of "rotorcraft-load combination" and defining a "Class D rotorcraft-load" received no adverse comments. It is adopted as proposed in Notice No. 85-8.

Ref: Proposals 4.506, 507, 526, 527, 532, and 534; Committee III.

Section 43.3 Persons authorized to perform maintenance, preventive maintenance, rebuilding, and alterations.

The proposed amendment would permit a Part 135 certificate holder that operates rotorcraft in remote sites to allow an appropriately trained authorized pilot to perform preventive maintenance as defined in Part 1 of this chapter and as listed in Appendix A to Part 43. Commenters strongly support this proposal. Numerous exemptions to the current regulations that allow such maintenance have been in effect for some time. To date, preventive maintenance performed under these exemptions has been extremely successful without any known misuse and has resulted in reducing the operating cost of helicopters operating in remote areas.

One commenter suggests that the term "remote area" be further defined to prevent misuse of the intent of this authorization. A remote area can be considered as an area out of the way, far removed from normal support services, or not easily accessible by land or sea. For example, offshore oil derricks, villages in the tundra area of Alaska, and mining sites in the upper Sierra Nevada would normally be considered remote. Any additional explanation is not approproate for the regulations. Accordingly, §43.3(h) is adopted as proposed.

Ref: Proposal 424; Committee III.

Section 43.15 Additional performance rules for inspections.

When this rule was initially proposed in Notice No. 85-8, the progressive inspection was inadvertently omitted. To correct this error, the word "progressive" was inserted in §43.15(c)(3) between the words "100-hour" and "inspection."

Several commenters recommend that §43.15(c)(2) and (3) be consolidated into one paragraph and that reference to aircraft type be changed to "a powered aircraft." Consolidation would not make the regulation any clearer. Emphasis on the fact that both reciprocating-engine-powered aircraft and turbine-engine powered aircraft require runups will help to clarify the intent of the present rule, which does not explicitly address turbine-engine-powered aircraft. Thus, the structure of the proposed rule is retained.

Commenters also express the view that the proposal would add confusion as to who should actually runup and/or start the aircraft engine to perform the required runup. As proposed, the regulation could be interpreted as requiring that the person who does the runup be the same person who approves the aircraft for return to service, even though that person may not be qualified to run the engine or engines. The rule requires that the person approving an aircraft for return to service be the person who shall perform the runup to determine satisfactory performance in accordance with the manufacturer's recommendation. If that person is qualified to return the aircraft to service, that person should also be qualified to perform the runup as required. Two other commenters recommend that, for rotorcraft, the person performing the runup should be a qualified pilot. They argue that when the engines of a helicopter with a fully articulated rotor system are runup, safety dictates that a pilot should perform that runup in case the rotorcraft becomes airborne. The FAA disagrees. Experience has shown that a mechanic who can approve the return of the helicopter to service should be able to safely runup the helicopter, exercising normal caution and good judgement. Section 43.15(c)(2) and (3) is amended as proposed.

Ref: Proposal 429; Committee III.

Part 43, Appendix A—Major Alterations, Major Repairs, and Preventive Maintenance.

All commenters referring to Part 43, Appendix A, strongly concur with the proposal, which would amend the Appendix by adding routine checks or replacement of fuel and oil strainers and filters and magnetic chip detectors under the category of preventive maintenance. The changes to Part 43, Apendix A, are adopted as proposed.

Ref: Proposals 431 and 432; Committee III.

Section 45.14 Identification of critical components.

One commenter proposes that the rule be amended to allow the omission of markings when the Administrator finds that a part is too small or that it is otherwise impractical to mark a part with any of the information required by the rule. The regulation for the marking of critical/life limited components is not new. The only change is that such marking must be made permanent and legible. The FAA has always recognized that some parts "on condition" and removed at overhaul due to wear, tolerance excesses, etc., are not suitable for permanent marking and do not have finite lives approved by the FAA. Further, such parts are not individually specified in the Maintenance Manual Limitations or Continued Airworthiness Document. Thus, such parts need not be permanently marked. Therefore, §45.14 is amended as proposed.

Ref: Proposal 433; Committee III.

Section 61.3 Requirement for certificates, ratings, and authorizations.

It was the intent of the Rotor 5 review to include authority for Category II operations for rotorcraft. The NPRM inadvertently omitted some of the changes necessary to implement this new authorization; therefore, several changes have been made to the final rule. One such change is the removal of the word "airplane" and its replacement by the word "aircraft" in §61.3(g). Another is the addition of Part 135 to the flush paragraph after paragraph (f)(2).

Section 61.21 Duration of Category II pilot authorization.

No public comments were received on §61.21, and the rule is amended as proposed.

Section 61.55 Second-in-command qualification.

The rule will extend the second-in-command pilot qualificatons to include helicopters that are type certificated for more than one required pilot flight crewmember. The proposed rule refers to "required flight crewmember." One commenter points out that unless the word "pilot" is inserted, the rule could be construed to include flight engineers. Since this is not the intent and the omission of the word "pilot" was unintentional, the FAA agrees with the suggestion and the rule is changed accordingly.

The portion of the rule pertaining to an "aircraft" simulator has been changed to "airplane" simulator to reflect the current rule. The FAA had proposed to permit the use of an "aircraft" simulator; however, the technology for helicopter simulation has not developed as rapidly as the technology for airplane simulation. The FAA will continue to develop guidelines for approval of rotorcraft simulation, and this issue will be addressed in another rulemaking action.

Ref: Proposal 438, Committee III.

Section 61.57 Recent flight experience: Pilot in command.

Section 61.67 Category II pilot authorization requirements.

Section 61.87 Requirements for solo flight.

Section 61.105 Aeronautical knowledge.

Section 61.107 Flight proficiency.

No public comments were received on §61.57, §61.67, §61.87, §61.105, or §61.107, and they are amended as proposed.

Section 61.113 Rotorcraft rating: Aeronautical experience.

Regarding the requirements for a helicopter class rating for a private pilot's license, one commenter suggests that the number of takeoffs and landings required in paragraph (a)(1)(ii) should be reduced to five or, alternatively, that the phrase "en route phase of flight" should be deleted. According to the commenter, if each landing/takeoff operation is separated by an en route phase of flight, an undue economic burden would be placed on the student since "the majority of these operations will be airport-to-airport." The commenter also points out that in some parts of the western United States, suitable night landing areas may be separated by distances in excess of 50 miles.

The FAA has not accepted the requested change for the following reason: The proposed aeronautical experience requirements were discussed at the conference, and it was the consensus that these specific experience requirements are needed to adequately train and prepare a private pilot applicant for a class rating in present-day rotorcraft. It should also be noted that ten takeoffs and landings are required for a private pilot's certificate in an airplane, which is less difficult to operate than a helicpoter. It is the position of the FAA that, by increasing the level of aeronautical experience for helicopters, the agency is promoting increased levels of safety. The requirement for ten takeoffs and landings is therefore adopted in the final rule.

The phrase "en route phase of flight" is a necessary part of the regulation, designed to prevent the applicant from merely lifting the helicopter above a given spot, hovering, and then returning it to that spot to achieve the required number of takeoffs and landings. Eliminating the requirement for an "en route phase of flight" would enable the applicant to circumvent the need to demonstrate an ability to maneuver the helicopter successfully at night in all phases of flight.

This requirement will not result in a undue economic burden. Contrary to the assumption made by the commenter that the majority of these operations would be airport-to-airport, a "takeoff and landing separated by an en route phase of flight" could be comprised of a takeoff, a short flight in the vicinity of the takeoff point, and a landing at the same place as the takeoff. An example would be a flight around the landing pattern.

The "en route phase of flight" is intended to relate to the need for certain piloting skills. Demonstration of these skills may be accomplished without flying over long distances. There is nothing in the regulation that requires an applicant to fly from one airport to another. The flight hours and maneuvers required in paragraph (a)(1)(ii) are necessary for safety and do not pose an unnecessary economic burden. Consequently, the rule is adopted as proposed.

An objection was raised to the proposed requirement for 15 hours of flight instruction in a gyroplane. This requirement is necessary to ensure a level of proficiency needed for safe operation of the aircraft. Accordingly, the proposed rule is adopted.

Ref: Proposal 448, 449, and 450; Committee III.

Section 61.125 Aeronautical knowledge.

No public comments were received on §61.125, and it is amended as proposed.

Section 61.127 Flight proficiency.

This section sets forth the operations that must be performed successfully to demonstrate the flight proficiency required to obtain a commercial pilot certificate. Among the maneuvers required for a helicopter commercial rating is rapid descent with power and recovery.

A number of objections were received regarding this rule. The commenters believe that a strong potential exists for an inexperienced student to be given a check ride by a check pilot not proficient in that particular helicopter. They express fear that this situation could lead to an accident in the event the maneuver is allowed to progress beyond reasonable limits. They question the benefit of requiring this maneuver during a check ride and suggest, alternatively, that settling with power be considered accomplished if the maneuver is signed in the student's log book by that student's instructor.

The FAA agrees that this maneuver may place the student and check pilot at undue risk. Under present Parts 27 and 29, neither the manufacturer nor the FAA demonstrates or evaluates entry or recovery from "settling with power" as part of the aircraft certification. Consequently, it is inappropriate to require the performance of an inflight maneuver that neither the manufacturer nor the FAA is required to observe during aircraft certification.

Delegation to the student's instructor of the FAA responsibility for ensuring that a certain level of flight proficiency has been attained is not the solution to this problem.

Instead, the applicant must demonstrate the ability to recognize and recover from imminent entry into settling with power, rather than to actually enter the flight regime from which it may be difficult to recover.

Accordingly, the final rule incorproates this requirement.

Ref: Proposal 453; Committee III.

Section 61.131 Rotorcraft ratings: Aeronautical experience.

A commenter suggests that commercial helicopter pilot applicants be required to have instrument flight training. The FAA does not agree with this position for several reasons. First, most helicopter operations are and will be conducted in Visual Flight Rules (VFR) conditions. In addition, the flight characteristics of rotorcraft are such that, if weather conditions begin to deteriorate, a pilot may easily and rapidly adjust altitude and direction or, if necessary, find a suitable landing site. Encountering IFR conditions in a rotorcraft is therefore not analogous to the same situation in an airplane, where suitable landing sites are far less numerous and altitude landing sites are far less numerous and altitude restrictions may be greater. Furthermore, there are fewer rotorcraft properly equipped for instrument flight than airplanes, making training and testing more difficult.

If a pilot wants to conduct operations in IFR conditions, the pilot can obtain an instrument rating. To require all commercial helicopter applicants to be trained in instrument flight would pose an unnecessary burden on the public.

Another commenter objects to the number of required hours for helicopter pilot-in-command flight. The commenter states that the requirements are reasonable for an upgrade from a private to a commercial certificate but excessive for a move from a commercial airplane to a commercial helicopter certificate. According to the commenter, most applicants will need more than 15 hours of flight instruction, and these hours are more important at this stage than pilot-in-command time. It is, therefore, suggested that the requirements be changed to 35 hours of flight instruction and 15 hours of pilot-in-command time.

Two commenters also state that the requirements for cross-country helicopter flight are excessive, expecially for those applicants who already have a commercial pilot certificate with an airplane rating. One of the commenters believes that the act of cross-country flying is not different in a helicopter than in an airplane and, therefore, the requirements should be relaxed for those applicants who hold a commercial pilot certificate with an airplane rating. The other suggests that, since helicopters are short-haul aircraft compared to airplanes, the 50 nautical mile requirement for cross-country flight should be reduced to 25 nautical miles.

The FAA does not concur with these suggestions. The requirements are necessary to demonstrate a proficiency commensurate with the subject rating. The current rule, which requires 10 hours of pilot-in-command time for commercial rotorcraft applicants, is outdated. In addition, as the world leader in training helicopter pilots, the United States is obligated to ensure that the terms of the International Civil Aviation Organization (ICAO) Convention are met. The requirement for 35 hours of pilot-in-command time is consistent with ICAO standards and is clearly reasonable for operations conducted by individuals accepting remuneration for their services.

The cross-country flight-time experience is introduced in these rules to align these minimums with ICAO standards. A cross-country flight in an airplane is not identical to a cross-country flight in a helicopter. A helicopter, with its different flight characteristics, is more affected by wind, which must be taken into consideration during the flight planning process. The wind effect becomes more significant over longer distances. In addition, piloting a helicopter, without the aid of an autopilot, is clearly more challenging when the pilot is, at the same time, attempting to navigate cross-country. Thus, the requirement for cross-country flight for an airplane commercial certificate cannot be substituted for the helicopter cross-country flight requirement.

Another commenter objects to the aeronautical experience required of an applicant for a commercial pilot certificate with a gyroplane class rating. The FAA agrees with the

commenter that the proposed minimum flight hours are excessive. The regulation as proposed would impose the same hour requirements for a gyroplane class rating as for a helicopter class rating: 50 hours of flight time in a gyroplane/helicopter; 15 hours of gyroplane/helicopter flight instruction time; and 35 hours of pilot-in-command time in a gyroplane helicopter. The commenter has operated under an exemption to the requirements contained in paragraphs (b)(3) and (4) since 1983. The exemption reduces the respective requirements for a gyroplane class rating to: 25 hours of flight time in a gyroplane; 10 hours of flight instruction in a gyroplane; and 15 hours of pilot-in-command time in a gyroplane. In granting this exemption, the FAA determined that the requirements could be reduced without adversely affecting safety. The FAA now reaffirms this finding and has amended §61.131(b) accordingly.

Ref: Proposal 454; Committee III.

Section 61.159 Rotorcraft rating: Aeronautical knowledge.

No public comments were received on §61.159, and it is amended as proposed.

Section 61.161 Rotorcraft rating: Aeronautical experience.

Proposed §61.161 (b)(4) is clarified by adding the word "performing" before the phrase "the duties of a pilot in command." The remainder of §61.161 is adopted as proposed.

Section 61.163 Rotorcraft rating: Aeronautical skill.

The portion of the proposed rule pertaining to an approved rotorcraft simulator or training device has been deleted. Helicopter simulation issues will be addressed in a separate rulemaking action.

Section 61.165 Rotorcraft rating: Additional category ratings. Part 61, Appendix A—Practical Test Requirements for Airplane Airline Transport Pilot Certificates and Associated Class and Type Ratings.

No public comments were received on §61.165 or Appendix A. They are amended as proposed.

Part 61, Appendix B—Practical Test Requirements for Rotorcraft Airline Transport Pilot Certificates with a Helicopter Class Rating and Associated Type Ratings.

The phrase "ground control approach" in proposed paragraph III(c) has been changed to "surveillance or precision radar approach" to agree with the terminology used in the Airman's Information Manual.

One commenter suggests that in paragraph I(d), the phrase "in accordance with operating limitations" be changed to "in accordance with the Rotorcraft Flight Manual procedures." The commenter notes that power assurance procedures are not operating limitations and are placed in the Rotorcraft Flight Manual in the normal procedures or performance section. The comment is valid, and the language of the final rule has been changed accordingly.

The utility of requiring circling approaches as part of the practical test requirements for rotorcraft airline transport pilot certificates was the subject of another comment. The commenter suggests deleting Section III(d) based on the view that a circle-to-land maneuver after completion of an instrument approach is remarkably simple and hazard free.

The FAA does not accept this argument. Performing the circle-to-land maneuver after completion of an instrument approach procedure may not always be simpler in a helicopter than it is in an airplane, depending upon the airport environment, weather, and other traffic. A circling approach basically involves different procedures than straight-in approaches. It is, therefore, appropriate for the FAA to require a demonstrated proficiency in executing the maneuver.

A number of commenters strongly object to other maneuvers and procedures required for rotorcraft airline transport pilot ratings. They question the safety and practicality of performing such maneuvers as simulated engine failure and autorotative landings during takeoffs and landings; settling with power; and demonstration of certain emergency procedures. They argue that the FAA inspector on a check ride may be inexperienced with the aircraft and, therefore, might not be able to ensure a safe recovery from these procedures. One commenter also notes that some insurance companies specifically exclude coverage of the aircraft if autorotative landings are involved. The commenters suggest that these maneuvers not be required during a check ride but, rather, that they be considered accomplished if there is an indication in the student's log book by that student's instructor pilot that the student has demonstrated adequate proficiency.

As mentioned in the discussion under §61.127, the FAA agrees that settling with power should not be a requirement for any flight check. Therefore, the requirement of proposed Part 61, Appendix B IV(b), has also been changed so that the applicant need only demonstrate a recognition of and recover from imminent flight in the regime referred to as "settling descent with power."

The FAA maintains that all of the other maneuvers and procedures specified in Part 61, Appendix B, should be performed as part of the check ride. It is the responsibility of the FAA to ensure that an applicant for a particular rating is sufficiently competent to maintain a high degree of safety throughout all flight regimes. The standards are even higher for those certificates that enable the successful applicant to offer services for financial remuneration. Thus, it would be inappropriate for the FAA to delegate this responsibility and only require a log book entry by a flight instructor indicating adequate proficiency.

Furthermore, FAA flight inspectors are trained for flight check duties in the category of aircraft in which they conduct flight checks. Also, if an aircraft insurer objects to the routine performance of certain procedures, such as autorotative landings, a one-day waiver can usually be obtained to enable the applicant to take a flight check ride. Finally, if a maneuver or procedure is too dangerous for performance in the aircraft, a prohibition against such activity will appear in the flight manual. Therefore, this maneuver or procedure would not be required in that particular aircraft.

Ref: Proposals 434, 456, 458, 463, 464, 466, and 471 through 480; Committee III.

Section 91.2 Certificate of authorization for certain Category II operations.

No comments were received on the proposal to amend §91.2 to afford small helicopter operators the opportunity of applying for Category II instrument approach authorization. To clarify the application of §91.2, the proposed language is revised in the final rule by substituting the word "aircraft" for "airplane" and by deleting the phrase "and helicopters," thereby excluding large helicopters as well as large airplanes from the authorization to deviate from the applicable requirements for Category II operations.

Section 91.23 Fuel requirements for flight in IFR conditions.

Section 91.23 requires 45 minutes of reserve fuel for all aircraft operating in IFR conditions and ceiling and visibility requirements of 2,000 feet and 3 miles for determining if an alternate airport is needed. The proposal contained in Notice No. 85-8 would reduce the IFR reserve fuel requirement for helicopters from 45 minutes to 30 minutes. It would also lower the minimum ceiling from 2,000 feet to 1,000 feet and lower the visibility minimum from 3 statute miles to 1 statute mile as criteria for determining if an alternate airport is needed.

Five of the seven commenters expressing views on this proposal fully support the proposed changes. One commenter, however, opposes the proposal, not only for lowering fuel reserve from 45 minutes to 30 minutes for helicopters, but for reducing the ceiling and visibility requirements used to determine whether an alternate airport is needed. This commenter expresses the view that the proposal would not only provide little usefulness to

the helicopter operator, but would significantly lessen the degree of safety that exists with the current rules. The commenter suggests that helicopter operators do not need relief from the fuel requirement rules in §91.23 for flight in IFR conditions but would be better served by modifying §91.83 concerning alternate airport selection requirements. A suggested amendment to §91.83 to accomplish this recommendation was proposed. Amendments to §91.83 were not considered in Notice No. 85-8; therefore, any changes affecting the substance of that section are not within the scope of this rulemaking.

Another commenter, though supporting the reduction of the required fuel reserve to 30 minutes for helicopters, questions the reduction of the ceiling and visibility requirements that determine the need for an alternate airport.

The FAA has sufficient experience with operations conducted under Special Federal Aviation Regulation (SFAR) 29, which reduces the required fuel reserve to 30 minutes for helicopters, to conclude that such a reduction will not lower the level of safety that has been established. This proposal would allow operators greater flexibility and utilization of their helicopters in the IFR environment. Accordingly, §91.23(a)(3) is adopted as proposed.

The question of weather minimums defined in paragraph (b)(2) has been analyzed in some detail. Subsequent to the recommendations developed at the Rotorcraft Regualtory Review Conference and Review Meeting, the FAA undertook an investigation to examine methods of providing a data base of weather information pertinent to the requirements and qualifications for alternate airports. The increased risk of ceilings and visibilities falling below landing minimums at several U.S. cities was quantified as a function of lowered visibility and ceiling requirements defined in paragraph (b)(2)(i) and (ii). The study utilized climatology data and weather deterioration models to calculate the probability that an airport would be below precision and nonprecision approach minimums. This investigation and study resulted in a report entitled "Weather Deterioration Models Applied to Alternate Airport Criteria," dated September 1981 (FAA-RD-81-92). The report reaches several preliminary but convincing conclusions. One of these directly related to the limitations defined in §91.23(b)(2) is: "Any reduction in alternate airport requirements should be offset by limiting the duration of the flights for which the reduced requirements apply. It is recommended that reduced requirements only apply to flights whose flight time is two hours or less." The proposal in Notice No. 85-8 to reduce the ceiling and visibility requirement, however, has no such limitation of flight time as considered necessary by the report. In light of this evidence, the ceiling and visibility requirements for helicopters contained in paragraphs (b)(2)(i)and (ii) remain unchanged from the previous rule.

Ref: Proposals 483 and 484; Committee III.

Section 91.116 Takeoff and landing under IFR: General.

No unfavorable comments were received on the proposal to amend §91.116 to establish a separate takeoff minimum of one-half mile visibility for helicopers. One commenter writing on this section recommends that takeoff minimums be established for all Part 91 operations as are landing minimums under this section. Such a suggestion is not a part of the rotorcraft review and is outside the scope of this rulemaking.

Ref: Proposal 494; Committee III.

Section 91.171 Altimeter system and altitude reporting equipment tests and inspections.

No comments where received on the proposed changed to §91. 171, and the rule is amended as proposed.

Part 91, Appendix A—Category II Operations: Manual, Instruments, Equipment and Maintenance

One of the purposes of the Rotor 5 rulemaking was to enable rotorcraft to perform Category II operations. In the NPRM, changes that would have made this new authority

possible were inadvertently omitted. These changes are now included in the final rule. In Part 91, Appendix A, this change has been accomplished by removing the world "airplane" and replacing it with the word "aircraft" wherever "airplane" appears.

Section 133.1 Applicability.

One comment was received regarding the rotorcraft external load operations requirements of paragraph (c)(4). The commenter suggests eliminating the requirement for a Rotorcraft External-Load Operator Certificate for customer acceptance flights. The commenter argues that it is not logical for the FAA to eliminate the requirements for a Rotorcraft External-Load Operator Certificate during the development phase and demonstration of compliance with requirements of Parts 27, 29, and 133 and continue to require a Rotorcraft External-Load Operator Certificate for customer acceptance flights. The FAA disagrees with the reasoning. When a manufacturer offers such rides to the public, a higher degree of safety should be required. These customer pasengers have a right to know that the safety of the flight on which they are about to embark has been reviewed by the FAA. The language proposed for paragraph (c)(4) is therefore adopted in the final rule.

Section 133.1(c)(5), as proposed, reiterated the exclusion of air carriers from rotorcraft external-load certification rules. The FAA has eliminated this excusion from the final rule for the following reasons. The exclusion eliminates the applicability of all Subpart B. Contained with Subpart B is §133.19(a)(2), which requires aircraft to meet certification requirements of Subpart D, including §133.43, Structures and design. Similarly, neither §133.21 nor §133.23 would be applicable to air carrier operators conducting external-load operations. It would therefore be possible for a pilot who had met the proficiency and skill requirements under Part 135 to not have the experience, knowledge, and skill required to conduct safely and external-load operation under Part 133.

This is not the intent of the regulation. Air carrier and external-load operations are so dissimilar in function that a separate pilot certification process should be required of an air carrier when requesting external-load approval. For this reason, the proposed §133.1(c)(5) has been deleted from the final rule.

Regarding proposed §133.1(c)(6), one commenter suggests that only external-load operations conducted by a U.S. military organization for purely military purposes or for operations that cannot be conducted by a certificated commercial operator be exempt from the certification rules. The commenter cites a growing trend of use of public aircraft in competition with bona fide certificated commercial operators that is placing commercial operators at an alleged unfair disadvantage. The commenter further claims that when operations that could be performed by a commercial operator within the limits of his certificate are performed by the military, the public is entitled to the same level of safety. The commenter also suggests that the exclusion be removed from all other operators of public aircraft when conducting external-load operations.

In response to these suggested changes, the FAA notes that according to §601 of the Federal Aviation Act of 1958, the Administrator is empowered to promote safety of flight of "civil aircraft," defined in §101(17) of the Act as "any aircraft other than a public aircraft." Thus, public-use aircraft are, by definition, already excluded from §133.1. The language of proposed §133.1(c)(6) is not a change in existing regulations; it merely makes explicit the exclusion of public-use aircraft from applicability. The rule is adopted as proposed and renumbered as §133.1(c)(5).

The number of persons to be carried in Class D rotorcraft-load combinations (§133.1(d)) is an issue for several commenters. One commenter states that "person" should be changed to "persons" so that the rule would provide for more than one person to be hoisted into and out of helicopters. The commenter, however, adds that these persons should be hoisted one at a time.

The rule, as written, does not limit the number of persons that can be hoisted into and out of helicopters. Therefore, no change to the rule is necessary to respond to the commenter's point.

Regarding the number of persons that can be carried at one time, the FAA does not want to place any restriction on this number at the present time. (See additional discussion on this issue in relation to proposed §133.35(b)).

Ref: Proposals 4, 506, 507, 526, 527, 532, and 534; Committee III.

Section 133.11 Certificate required.

Section 133.13 Duration of certificate.

Section 133.21 Personnel.

Section 133.23 Knowledge and skill.

Section 133.25 Amendment of certificate.

Section 133.27 Availability, transfer, and surrender of certificate.

Section 133.31 Emergency operations.

No public comments were received on §133.11, §133.13, §133.21, §133.23, §133.25, §133.27, or §133.31, they are amended as proposed.

Section 133.33 Operating rules.

A commenter suggests a new paragraph for this section. The purpose is to exclude the flight operations check in §133.33(c)(4) to (6) if the external load is to be moved only a short distance and at translational speeds just above a hover. The stated rationale is that loads are often carried only vertically with little or no horizontal movement. The commenter argues that the requirement for forward flight tests to determine controllability is superfluous and unnecessary in these cases.

The FAA does not agree that the suggested additional paragraph is needed. Revised §133.33(c) clearly states that those flight-operational checks will be required "as the Administrator determines are appropriate to the rotorcraft-load combination." Those flight tests that are "superfluous and unnecessary" would not be required.

The requirement in §133.33(d)(1) for submitting and gaining approval for a plan for each rotorcraft external-load operation over congested areas presents problems for one commenter, who claims that much business would be lost to ground-based competition while the rotorcraft operator attempts to comply with the regulation. The commenter notes that the detail contained in the proposed regulations is more appropriate for an advisory circular or handbook. If some type of plan is deemed necessary, the commenter suggests that the helicopter operator be required to submit to the FAA district office a plan that provides details of steps to be taken to conduct the operation without hazard to persons and property. The plan should be given to the district office before the operation, and the chief pilot or assistant chief pilot would have to certify that the operation would be conducted safely.

The FAA is responsible for developing procedures designed to ensure that external-load operations over congested areas are conducted safely and, through inspection and surveillance activities, to make certain that such procedures are followed. The FAA cannot delegate this oversight responsibility to those who actually conduct the operations, and consequently, has not adopted the suggested change.

The FAA also disagrees with the statement that the regulations go beyond the scope of a normal rulemaking and are more appropriate for an advisory circular or handbook. On the contrary, the regulation provides only guidelines on the types of components comprising a plan of the kind required. Details regarding specific information to be included in each component of the plan would be more appropriately the subject of an advisory circular or handbook. As for the issue of delay, the FAA will attempt to act on any submitted plan in an expeditious manner; however, the FAA cannot compromise safety to promote any given helicopter operation.

One commenter finds the language of §133.33(f) too restrictive and suggests a change so that a person could conduct operations under IFR within the confines of a control zone when under the terms of a special VFR clearance or otherwise specifically approved by the Administrator. The rationale is that an external-load operation conducted in IFR conditions within a control zone is viable and safe under the terms of a special VFR clearance.

The FAA does not agree. The conduct of an external-load operation in IFR conditions is of sufficiently high risk that the FAA reserves the right to approve each operation. In fact, to clarify that the rule applies to all operations conducted under IFR and not only those in IFR meteorological conditions, the final rule has been changed to read "under IFR" instead of "in IFR conditions."

Finally, it should be noted that the operator has not been precluded from conducting operations under the terms of a special VFR clearance. However, approval from the Adminstrator will be required for a special VFR clearance to conduct external-load operations.

One commenter proposes the deletion of subparagraph (e) because, it is argued, §91.119(d) specifically excludes helicopters from "hard numbers." The FAA chooses not to delete this language because it serves as a clarification of the §133.33 rules as they pertain to helicopter operations. The language of §133.33 is consistent with §91.119(d).

Section 133.35 Carriage of persons.

One commenter proposes the following addition to §133.35(a): "(5) Is a person which forms a part of or is associated with a Class D external-load."

This language is redundant with the provisions already in the rule. The language proposed in Notice No. 85-8 clearly permits a person to be associated with a Class D external-load. The final rule, therefore, is adopted as proposed.

There were a number of comments on §133.35(b) regarding the persons to be carried as a Class D load and the distance over which they can be transported. One commenter states that there should be restrictions on how many persons should be carried at a time, suggesting that the number be limited to one. Others object to the carriage of any person in a hoist outside the aircraft for any distance.

In contrast, one commenter proposes an exclusion from paragraph (b) for those operations where persons are carried externally but are not intended to be hoisted inside the helicopter, such as the transfer of workers from a boat alongside a well-head to the well-head proper. Another commenter claims that it is too restrictive to limit a Class D load to one person, citing the successful experiments with 10-mar. Billy Pugh nets in rescue operations.

Proposed §133.35(b) has been deleted on the basis that it is too restrictive to implement a blanket restriction on the number of persons carried as a Class D load and the distance over which these persons can be carried. Rather than specify limits in a regualtion, the FAA will give appropriate guidance for Class D external-load operations to FAA district offices. The conditions under which an operator can carry persons externally will be included in that operator's approved Operations Specification. Proposed §133.35(c) had been redesignated as §133.35(b) in the final rule.

Proposal 532; Committee III.

Section 133.37 Crewmember training, currency, and testing requirements.

No public comments were received on §133.37. However, there is a potentially confusing use of the terms "class" and "type" in paragraph (c) in conjunction with external-load operations. The operation referred to relates to a particular class of external-load operation in a particular type of aircraft. No class of aircraft is intended to be specified. Accordingly, the rule has been amended to clarify the intent. Also, the proposed requirement for testing within the past 12 calendar months has been deleted.

Section 133.41 Flight characteristics requirements.

No public comments were received on §133.41, and it is adopted as proposed.

Section 133.45 Operating limitations.

One commenter notes that the proposed rule would eliminate all multiengine helicopters certificated under Part 27 and those certificated as Category B under Part 29 from conducting Class D operations. The FAA has considered this effect; however, the appropriate level of safety dictates a higher standard of airworthiness requirements for conducting Class D operations. Therefore, the rule requires multiengine Category A rotorcraft for Class D operations.

Section 133.47 Rotorcraft-load combination flight manual.

Section 133.51 Airworthiness certification.

Section 135.1 Applicability.

Section 135.23 Manual contents.

Section 135.39 Management personnel qualifications.

Section 135.117 Briefing of passengers before flight..

No public comments were received on §133.47, §133.51, §135.1, §135.23, §135.39, or §135.117; and they are adopted as proposed.

Section 135.159 Equipment requirements: Carrying passengers under VFR at night or under VFR-over-the-top conditions.

One commenter, noting that the requirements of §135.159 serve to underline the need for training of helicopter pilots in instruments, proposes that a radio altimeter with a visual or aural warning be required in addition to gyroscopic flight instruments. No justification other than the need for instrument training is given by the commenter. No safety justification is given for the proposal. Further, requirement of such a radio altimeter was not included in Notice No. 85-8, and the public has not had the opportunity to comment on an item of equipment that could have a considerable economic impact on some helicopter operators. Accordingly, the proposal is not accepted.

Another commenter points out that the proposed amendment to §135.159 is somewhat confusing and does not completely solve the problem of determining what instruments are appropriate for the safe operation of helicopters under VFR at night. The FAA agrees, and the organization for §135.159 has been modified. Though the regulation adopted is basically the same as proposed in Notice No. 85-8, the rule as adopted has been clarified to provide a clear and more meaningful presentation of the requirements.

Ref: Proposal 552; Committee III.

Section 135.167 Emergency equipment: Extended overwater operation.

No adverse comments were received on the proposal. One commenter, however, expresses concern that the proposed regulation did not recognize the high incidence of puncturing of liferafts on ditching. That commenter believes the text should stipulate an adequate design requirement versus the number of passengers anticipated. Proposed language was offered as an addition to the proposal to ensure that there were no sharp projections on the aircraft that might puncture survival equipment. The FAA has determined that this is not necessary. This regulation must be read in context with all of the regulations in this chapter, particularly those certification regulations for design requirements for aircraft and equipment. Such basic design requirements are adequate to ensure inadvertent puncturing of survival equipment or difficulties that could arise during a ditching situation.

Paragraph (b)(3)(i) was revised by deleting the word "approved." The FAA will provide guidelines for the contents of survival kits through advisory material rather than

set specific standards to which all kits should conform. Air Carrier Operations Bulletin 9-59 provides such guidance. Section 135.167 is adopted as revised.

Ref: Proposal 555; Committee III.

Section 135.173 Airborne thunderstorm detection equipment requirements.

Section 135.181 Performance requirements: Aircraft operated over-the-top or in IFR conditions.

No public comments were received on §135.173 or §135.181, and they are adopted as proposed.

Section 135.223 IFR: Alternate airport requirements.

This proposal reduces helicopter fuel reserve requirements from 45 minutes to 30 minutes for flights in IFR conditions. It is closely related to proposed §91.167 concerning fuel requirements for flight in IFR conditions. The commenters who oppose the reduction of such requirements in Part 91 also oppose the proposed change in the operating rules of Part 135. However, the majority of commenters strongly support the proposal. As previously stated, the FAA has gained sufficient experience in SFAR 29 operations to conclude that reducing the required fuel reserve to 30 minutes for helicopters will not compromise safety. Accordingly, §135.223 is adopted as proposed.

Ref: Proposal 562; Committee III.

Section 135.227 Icing Conditions: Operating limitations.

No adverse comments were received on this proposal to amend §135.227 to allow helicopters to fly in icing conditions when the aircraft has been type certificated and appropriately equipped for operations in icing conditions. In this regard, it should be noted that at least one helicopter is now so certificated. Thus, it is appropriate to amend the operating rule to allow the use of such helicopters in icing conditions. Section 135.227 has been amended accordingly.

Ref: Proposal 564; Committee III.

Section 135.429 Required inspection personnel.

One commenter objects to proposed §135.429(d), arguing that a person whose competency as a mechanic has not been certified should not be performing maintenance on or inspecting an air carrier aircraft. The commenter does not agree with the argument that remote area operations require unique and innovative accommodations to allow a pilot to perform such inspections on helicopters.

The FAA disagrees. The pilot training under the regulations for utilization of this section requires the same level of competency as an inspector at the home base to ensure safety in all circumstances, particularly in the unique situations that may arise at "remote" localities. In addition, the remaining requirements of this section ensure that the procedures developed for this situation are tightly controlled. Another commenter suggests that "remote areas" be further defined. This issue has been discussed in conjunction with the proposal affecting §43.3. Section 135.429(d) is adopted as proposed.

Ref: Proposal 568; Committee III.

Economic Summary

The revised rules are expected to have immediate economic impact. All costs and savings data have been inflated* to 1985 dollars from the original 1982 dollars data appearing in the regulatory analysis for the NPRM. These data were derived by the FAA from estimates of industry conditions in late 1981 obtained by research on representative

* The Department of Commerce's December 1985 implicit price deflator for the period 1982-1985 was used to inflate the costs and savings data for this analysis.

operator groups (operating under Parts 91, 133, 135, 137 and 141), which comprise the rotorcraft industry. A 5 percent profit margin factor was used to derive increased profits and lost profits from revenue increases or decreases, respectively. Cost savings are presumed to increase profits by an equal amount.

The 43 regulatory changes in Notice No. 85-8, which were determined to have a negligible or no technical impact, and consequently a negligible or no economic impact, are listed in Table 2, "Rotorcraft Regulatory Review Program Notice No. 85-8 Rule Changes Having Negligible Or No Economic Impact." Many of these changes are either editorial or clarifying in nature. In addition, some changes incorporate into regulations what has become the current practice of the FAA or industry. The assessment of their economic impacts is based on current industry practice, agency experience, and the explanations given under each rule change in the preamble for this rule. No estimates of specific costs or savings are made for these groups of proposals, and the proposed changes are not further discussed in the economic evaluation except where referenced in the table to Appendix A. Additional discussion to that given in the preamble for those eight referenced changes is given in Appendix A of the Regulatory Evaluation.

The remaining operation and maintenance changes in Notice No. 85-8 are determined to have an impact, but the impact is not considered to be major under the procedures and criteria prescribed by Executive Order 12291 or significant under the Department of Transportation Regulatory Policies and Procedures (46 FR 11034; February 26, 1979), and the changes will not have a significant economic impact on a substantial number of small entities. A discussion of and tables for the benefits and costs (savings) of the eight changes shown in Table 1 and a regulatory flexibility determination for the impacts on small business entities for each of the four changes having an adverse economic impact are presented below.

(See P-119 and P-120 for Tables 1 and 2.)

Table 1

Cost and Savings of Notice No. 85-8 Rule Changes Having an Economic Impact

FAR Section	*Rule Changes*	*Industry Cost (Savings)*	*Principal Reason(s)*
Part 43	Appendix A: Major Alterations, Major Repairs and Preventive Maintenance	($461,000 recurring annual cost decrease) ($25,000 annual profit increase)	Reduced expense to transport and use mechanics in remote areas; reduced rotorcraft downtime.
91.23	Fuel Requirements for IFR Flight	($542,000 recurring annual cost decrease)	Reduced operatonal costs from carring less fuel.
133.21	Pilots	($537,000 recurring annual cost decrease)	Reduced cost from not having to transport chief pilot to field locations.
133.41	Flight Characteristics Requirements	($380,000 recurring annual cost decrease) ($2,100 annual profit increase)	Reduced number of operatonal flight checks.
133.51	Airworthiness Certification	($116,000 annual cost decrease) ($10,000 annual profit increase)	Reduced paperwork and administrative costs.
135.159	Equipment Requirements	$681,000 one-time cost increase $70,000 recurring annual cost $3,400 one-time lost profit $18,000 annual lost profit	Purchase and installlation of Attitude and Heading indicators for rotorcraft now operated under Exemption 2695B. Maintenance cost for instruments; one-time loss for downtime associated with installation; annual loss for some operators stopping night flight instead of purchasing instruments.
135.173	Airborne Thunderstorm Detection Equipment Requirements	$153,000 one-time cost increase $16,000 recurring annual cost[1]	Purchase, installation and maintenance of minimum thunderstorm detection (TDX) equipment. It is equipment meeting intent and requirement of rule change for rotorcraft now operating under Exemption 2695B.[1]
135.429	Required Inspection Personnel	$117,000 one-time cost[2] ($281,000 recurring annual cost decrease) or ($262,000 net annualized cost decrease—10 years, 10% capital recovery)	Relieved work requirements for work done at remote areas or sites. One-time cost for some operators to install more extensive system of maintenance.[2]

[1] This estimate can vary from no cost to industry estimate shown. The decision to install TDX equipment or to cease flying depends on the prevailing thunderstorm weather occurrence in the area of normal operations and the flexibility an operator has to delay revenue flights until weather improves and to reschedule time into other time periods.

[2] The one-time cost accrues to a limited number of operators currently utilizing Exemption 2695B, which permits maintenance under §135.411(a)(l) instead of §135.411(a)(2). If only the exemption itself were removed, industry may have recurring cost increases. However, the change provides the primary benefit of the exemption to §135.411(a)(2), and almost all of the expected recurring cost for them would not be incurred.

Table 2

Rotorcraft Regulatory Review Program
Notice No. 85-8 Rule Changes Having Negligible
Or No Economic Impact

	FAR Section	Economic Impact
FAR Part 1	1.1	No impact—definition
FAR Part 43	43.3	Impact considered with Part 43 Appendix A
	43.15	Negligible costs
FAR Part 45	45.14	Negligible costs (Also see Appendix A in this evaluation)
FAR Part 61	61.55	Negligible costs (Also see Appendix A in this evaluation)
	61.57	No impact—clarification
	61.87	Negligible costs
	61.105	Negligible costs
	61.107	Negligible costs
	61.113	Negligible costs (Also see Appendix A in this evaluation)
	61.125	Negligible costs
	61.127	No impact
	61.131	Negligible costs (Also see Appendix A in this evaluation)
	61.159	Negligible costs
	61.161	Negligible savings
	61.163	Negligible costs (Also see Appendix A in this evaluation)
	61.165	No impact
	Appendix A	No impact—clarification
	Appendix B	Negligible costs (Also see Appendix A in this evaluation)
FAR Part 91	91.2	No impact
	91.116	Negligible savings
	91.171	Negligible costs
FAR Part 133	133.1	Negligible savings
	133.11	No impact—clarification
	133.13	No impact—clarification
	133.23	Negligible savings
	133.25	No impact—clarification (see 133.51)
	133.27	No impact—clarification (see 133.25)
	133.31	No impact—clarification
	133.33	No impact—clarification
	133.35	Negligible savings
	133.37	No impact—optional standard—see 133.1 (Also see Appendix A in this evaluation)
	133.39	No impact
	133.45	Negligible savings
	133.47	No impact—clarification (see 133.45)
FAR Part 135	135.1	Negligible savings
	135.23	No impact—clarification
	135.39	Negligible savings
	135.117	Negligible savings
	135.167	Negligible costs (Also see Appendix A in this evaluation)
	135.181	Negligible savings
	135.223	Negligible savings
	135.227	No impact—clarification

Benefits and Costs (Savings)

In addition to editorial changes to the clarification of the present regulations, benefits are likely to accure from other changes in this notice. Five changes (Part 43, Appendix A; §91.167; §133.21; §133.41; and §133.51) will provide operational and maintenance cost savings to Part 91, 133, and/or 135 operators. Three changes will cause incurring of new costs. One of these, §135.429, has an initial one-time cost by will provide a net annual cost decrease through relieved inspection work requirements. The other two, §§135.159 and 135.173, increase passenger safety. The costs of these will impact Part 135 operators currently provided relief from the present regulations by using Exemption 2695B.

For a complete discussion of the above, see the copy of the economic evaluation in the Docket, or request a copy from the individual listed under "FOR FURTHER INFORMATION CONTACT."

International Trade Impact Analysis

With the exception of three negligible cost changes that affect both airplanes and rotorcraft, this rulemaking action implements changes to the regulations governing only the operation and maintenance of rotorcraft in the United States. It should not impact U.S. services in foreign countries nor have a significant impact on foreign services in the United States. In regard to foreign services, for one example, persons authorized to conduct operations in the United States as a foreign air carrier are issued operations specifications in accordance with the requirements of Part 129 of the Federal Aviation Regulations. Therefore, the FAA cannot discern what impact, if any, this regulation would have on international trade.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure, among other things, that small entities are not unduly affected by Government regulations.

The RFA requires agencies to prepare regulatory flexibility analyses of rules that may have a "significant economic impact on substantial number of small entities." Thus, the first step in conducting a regulatory flexibility analysis is to determine whether any rule change has a significant economic impact on a substantial number of small entities. The number of businesses and all other estimates used in the following determination have been derived from information and data obtained through industry research on representative rotorcraft operators.

Three changes—§135.159, Equipment requirements; §135.173, Airborne thunderstorm detection equipment; and §135.429, Required inspection personnel—impose an additional cost on some part 135 operators. The cost imposed by the three changes is due to the planned expiration of FAA Exemption 2695F and the impact of its removal on those operators now holding the exemption. By examining the exemption holding status of the rotorcraft operators now eligible for relief from the particular rule requirement, two tests can be used to determine whether or not a substantial number of them are significantly impacted.

The RFA requirements are triggered if 34 percent of the operators using the exemption to meet the requirements of §135.159 (96 operators out of an estimated 286 who conduct night operations) incur an annualized cost increase greater than $3,300. As further explained below, the analysis indicates that these conditions are not met for any of these changes.

§135.173 Airborne thunderstorm detection equipment requirements.

Although the rule change will be relieving because the requirement for thunderstorm detection equipment for VFR operations has been modified to allow helicopter flight without the equipment under certain conditions, one group of small rotorcraft operators will be adversely affected. These are the operators who use Exemption No. 2695F, which permits the operation of rotorcraft of ten passenger seats or more under VFR (day or night) without thunderstorm detection equipment.

An estimated 41 small operators own or operate rotorcraft with 10 or more passenger seats. An estimated 9 of these 41 use the exemption and are directly affected, but only 6 will incur an annualized economic impact greater than $3,300 when the exemption is removed.** Because these six comprise only 15 percent of the affected population, a regulatory flexibility analysis of the exemption from the requirements of §135.173 is not required.

§135.429 Required inspection personnel.

Currently, a limited number of small operators of rotorcraft with passenger seating configurations of 10 seats or more use the exemption, which permits such operators to utilize the maintenance requirements of §135.411(a)(1) for 9 passenger seats or less instead of §135.411(a)(2) for their rotorcraft. When the exemption is removed, these operators may incur costs to install a more extensive system of maintenance for 10 plus passenger rotorcraft, but the change to §135.429 will also retain most of the annual benefits that these operators achieved under the exemption to §135.411 (a)(2).

An estimated 41 small operators own or operate rotorcraft with 10 passenger seats or more. Six of these use the exemption and will be directly affected when the exemption is removed. Even if all six incurred an annualized economic impact greater than $3,300, these six would comprise only 15 percent of the affected population. Therefore, a regulatory flexibility analysis for removal of the exemption from the requirements of §135.411(a)(2) is not required.

§135.159 Equipment requirements: Carrying passengers under VFR at night or under VFR over-the-top conditions.

This rule requires that, for §135.159, FAA Exemption No. 2695B be rescinded. The exemption permits the operation of rotorcraft with a maximum certificated takeoff weight of 6,000 pounds or less at night under VFR without the following instruments:

(a) Slip skid indicat

(b) Gyroscopic bank and pitch (attitude) indicator; and

(c) Gyroscopic direction (heading) indicator.

An estimated 254 small operators conduct night operations and have one or more of the subject size aircraft in their fleet. Of these 254 operators, an estimated 104 would be directly affected by removal of the exemption. However, further industry research indicates that of the 120 operators who use the exemption, only 59 will experience an annualized cost greater than $3,300 when the exemption is removed. Because these 59 operators comprise only 23 percent of the 254 operators who are subject to the proposed regulation (they fly at night), a regulatory flexibility analysis is not required for removal of Exemption No. 2695F from the requirements of §135.159.

In addition to the above economic impacts, the final rule is expected to have beneficial effects on many small businesses. These also are discussed in detail in the Regulatory Flexibility Analysis contained in Appendix B of the Regulatory Evaluation which has been placed in the docket. A summary of these beneficial effects follows.

§133.21 Personnel.

The objective of these rules is to eliminate external-load accidents due to inadaquate pilot competence in performing particular operations. Two methods of ensuring such pilot competence (which can be combined) are to require experience, such as through a "trainee" pilot working a certain amount of time with a "qualified" pilot, and through pilot testing by a qualified examiner. The proposal would permit pilot testing to be carried out by FAA employees, designated examiners, or individuals within the particular company performing the external-load operation. Present regulations provide for such test only by the Chief Pilot.

** The analysis was measured with information obtained from industry research made for a stricter rule proposal removing the exemption for this FAR, and the estimate is therefore conservative; that is, the magnitude of impact for each operator is expected to be less.

An estimated 179 external-load operators are potentially affected by this rule. Almost all may be assumed to be small. Benefits may be considered roughly proportional to fleet size, although variations may be expected due to operating territory and other factors. Therefore, to the extent that small operators have smaller fleets than large ones, the $481,000 projected annual cost savings may be expected to average no more than $2,687 per affected operator.

Industry research indicates that over 40 percent of Part 133 certificate holders also hold Part 135 certificates. The total fleet size distribution of Part 133 operators is unknown. Regardless of whether or not it resembles the distribution of the Part 135 fleet. The relatively high maximum average impact suggests that the threshold of economic impact significance could very well be exceeded by one-third of the potentially affected small operators.

§133.41 Flight characteristics requirements.

The objective of these rules is to reduce accidents resulting from the use of particular combinations of rotorcraft models with certain external loads and external-load attaching devices. Many such combinations of rotorcraft models, external loads, and external-load attaching devices pose a significant risk of accident even when under the control of a competent pilot. The FAA concludes that confidence in the external-load operation can only be maintained when each possible rotorcraft-load combination is successfully demonstrated at least once.

An estimated 164 external-load rotorcraft operators are potentially affected by this rule. Almost all may be considered small. Benefits may be considered roughly proportional to fleet size, although variations may be expected due to fleet diversity and other factors. Therefore, to the extent that small operators have smaller fleets than large ones, the $340,000 projected annual cost savings and $2,000 annual profit increase for all affected carriers combined may be expected to be no greater than $2,085 per potentially affected small operator, on average.

As stated previously, industry research indicates that somewhat over 40 percent of Part 133 certificate holders also hold Part 135 certificates. The size of the average impact, however, suggests that the threshold of economic impact significance could well be exceeded by one-third of the potentially affected small operators. Section 133.41 is closer to the borderline in this regard than §133.21.

Cumulative Economic Impact

The changes to Part 43, Appendix A, and §§91.23, 133.21, 133.41, 133.51, 135.169, 135.173 and 135.429 refer to different, but partially overlapping, categories of operators. The following eight changes are considered to have overlapping impacts:

(1) Part 43. Appendix A—Part 135 operators serving remote areas.

(2) Section 91.23—Part 91 operators (not holding Part 135 certificates) flying to some extent under IFR.

(3) Section 133.21—Part 133 operators in general.

(4) Section 133.41—Part 133 operators in general.

(5) Section 133.51—Part 133 operators in general.

(6) Section 135.159—Part 135 operators flying to some extent VFR at night.

(7) Section 135.173—Part 135 operators using rotorcraft with 10 seats or more.

(8) Section 135.429—Part 135 operators using rotorcraft with 10 seats or more.

Although the first and second categories are, by definition, separate from each other, there exists no operator survey data that would allow the determination or reliable estimation of the actual extent to which each of the other categories overlaps. It is possible to estimate, however, whether or not it is likely that the number of operators experiencing a significant cumulative net economic impact (beneficial or detrimental) from all eight of

these rules would constitute one-third or more of the total of individual potentially affected operators, given the (separate) distributions of fleet size for Part 135 and non-Part 135 operators. The determination can be made by assuming operator impact is proportional to operator fleet size.

The total of individual operators potentially affected by any of the rules may be estimated as follows:

Part 135 operators, including all in proposal categories (1), (6), (7), and (8), and 42 percent of those in categories (3), (4), and (5). *Note*: It is estimated that 42.4 percent of Part 133 operators also hold Part 135 certificates	358
Non-Part 135 certificate holders, including 57.6 percent of those in proposal categories (3), (4), and (5)	393
Total	751

This estimate maximizes the extent of "overlapping" among relevant categories and increases the chance of one-third or more of the total individual operators' experiencing a significant cumulative net impact. This is the case because some of the overlapping considered above is not necessarily the most likely representation of actual practice. For example, Part 91 operators that fly under IFR may well not also engage in Part 133 operations, which are generally carried out under VFR.

Even with maximum overlapping of potentially affected small operator categories and given the relatively large number of non-Part 135, and even Part 135, operators that have single-craft or very small fleets, and estimated 217 out of 751 would be expected to bear a significant cumulative impact from the eight rules. The remaining 534 would not be significantly impacted. The number of small operators expected to be impacted would be less than one-third of the total of such operators unless at least 120 of those operators were eliminated by being designated "large" operators. Therefore, it is reasonable to expect that the cumulative net economic impact (beneficial or detrimental) of these rules would not reach significant levels for one-third or more potentially affected small operators.

The determination is sensitive to assumptions made concerning (1) the number of proposal category (2) operators eliminated as "large" entities, and (3) the fleet size of "small operators."

Conclusion

A final regulatory flexibility analysis is not required for the revisions being made to §§135.159, 135.173, and 135.429. For each of the revisions, the annualized cost is not greater than $3,300 for more than one-third of the operators who would be affected by the revised regulation. In view of the above, the regulatory changes herein will not have a significant economic impact on a substantial number of small entities.

Reporting and Recordkeeping Requirements

The reporting and recordkeeping requirements contained in this amendment have previously been approved by the Office of Management and Budget and have been assigned Control No. 2120–0044.

Conclusion

This rule upgrades rotorcraft certification and operational requirements and allows operators to utilize rotorcraft more fully. Therefore, the FAA has determined that this rule is not major under Executive Order 12291 or significant under Department of Transportation Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). Based on the Regulatory Flexibility determinations discussed in this document, I certify that this rule will not have a significant economic impact on a substantial number of small entities. The regulatory evaluation of this rule is contained in the docket. A copy may be obtained by contacting the person identified under "FOR FURTHER INFORMATION CONTACT."

In consideration of the foregoing, Parts 1, 43, 45, 61, 91, 133, and 135, of the Federal Aviation Regulations (14 CFR Parts 1, 43, 61, 91, 133, and 135) are amended effective January 6, 1987.

The authority citation for Part 43 is revised to read as set forth below, and the authority citations following each of the sections of Part 43 are removed:

Authority: 49 U.S.C. 1354, 1421 through 1430; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983).

Amendment 43-26

Air Traffic Control Radar Beacon System and Mode S Transponder Requirements in the National Airspace System

Adopted: January 29, 1987 **Effective: April 6, 1987**

(Published in 52 FR 3380, February 3, 1987)

SUMMARY: This action establishes requirements pertaining to the use, installation, inspection, and testing of Air Traffic Control Radar Beacon System (ATCRBS) and Mode S transponders in U.S.-registered civil aircraft. The rule adopted continues to require a transponder for operation in each terminal control area (TCA) and in the airspace of the 48 contiguous states and the District of Columbia above 12,500 feet above ground level (AGL). Automatic pressure altitude reporting equipment, which is currently required in all of the above airspace except Group II TCA's, will be required in Group II TCA's effective December 1, 1987. The rule provides for a phased transition from ATCRBS to Mode S transponders in the National Airspace System (NAS) by limiting the manufacture and installation of ATCRBS transponders. After January 1, 1992, all newly installed transponders in U.S.-registered civil aircraft are required to meet the requirements of the technical standard order (TSO) for airborne Mode S transponder equipment.

The rule also permits ATCRBS transponders already installed on that date to be used indefinitely. Projected increases in air traffic will require improved aircraft location and identification information, which will be provided by the Mode S and automatic pressure altitude reporting equipment. These requirements are an essential component of the NAS Plan. Mode S is also a necessary technical prerequisite to obtain data link services which allow digital exchange of information between aircraft and the ground. The FAA will provide these services beginning on/about 1990. This action also sets forth test and inspection requirements for the Mode S transponder and a new output power test requirement for the ATCRBS transponder.

EFFECTIVE DATE: April 6, 1987

FOR FURTHER INFORMATION CONTACT: Mr. Gene Falsetti, Airspace and Air Traffic Rules Branch, Airspace—Rules and Aeronautical Information Division, Air Traffic Operations Service, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591; telephone: (202) 267-9249.

SUPPLEMENTARY INFORMATION:

The three kinds of aircraft equipment addressed by this rulemaking are as follows:

Air Traffic Control Radar Beacon System, (ATCRBS). A radar system in which the aircraft to be detected is equipped with a radio receiver/transmitter called a transponder. Radar pulses transmitted from the ground are received by the transponder and used to trigger a distinctive transmission from the transponder. The controller's radar receives this transmission and displays a distinct and amplified return on the radar scope.

Mode S Transponder. The Mode S Transponder is an advanced version of the existing ATCRBS transponder. The Mode S transponder is completely interoperative and compatible with the current ATCRBS system. Mode S utilizes a discrete set of radio pulses (code) for each individual aircraft, and is not limited to the maximum 4,096 possible codes of the ATCRBS transponder. Mode S also adds the capability to provide a data link between the aircraft and the ground.

Mode C (Automatic Altitude Reporting Equipment). Some transponders are equipped with a Mode C capability. Mode C is that function of a transponder which responds to specific ground interrogations by transmitting the aircraft's current altitude in 100 foot increments. This information is received by ground equipment and displayed on the controller's scope in the data block for the transmitting aircraft. Mode C may be used with both ATCRBS and Mode S transponders.

History

On October 18, 1983, the FAA published an Advance Notice of Proposed Rulemaking (ANPRM) announcing the proposed use of Mode S transponders in the NAS (48 FR 48364, Notice No. 83-16). The following was proposed to take effect by 1992 or earlier, as noted:

1. Issuance of a technical standard order (TSO) for airborne Mode S transponder equipment. With issuance, TSO authorization to manufacture ATCRBS transponders would be terminated effective in 1986.

2. Amendment of Federal Aviation Regulations (FAR) Part 43 to include tests and testing procedures appropriate to Mode S transponders.

3. Amendment of FAR Part 91 as follows:

a. Newly installed transponders in U.S.-registered civil aircraft would meet requirements of the new TSO for airborne Mode S transponder equipment.

b. Either a Mode S or ATCRBS transponder, as well as automatic pressure altitude reporting equipment, would be necessary to operate in TCA's.

c. Either an operable Mode S or ATCRBS transponder, as well as automatic pressure altitude reporting equipment, would be necessary above 12,500 feet MSL in U.S. airspace. The proposal would retain the current exception for gliders above 12,500 feet MSL and retain provisions for helicopters and air traffic control (ATC) authorized deviations.

d. Automatic pressure altitude reporting equipment would be required for operations in Group II TCA's.

4. Amendments to FAR Sections 121.345(c), 127.123(b), and 135.143(c) to be consistent with the amendments to Part 91.

Comments—Proposed Introduction of Mode S

Comments were generally favorable to the proposed introduction of Mode S in the NAS. Twelve (12) comments were received which, though generally supportive, expressed some concern in several areas.

The areas of concern centered on:

1. The ramifications to U.S. manufacturers, foreign governments, and various international users regarding early cutoff of the TSO authorization to manufacture ATCRBS transponders in 1986.

2. The need for improved accuracy of altitude data, improved automatic pressure altitude reporting equipment, and reduced quantization (i.e., smaller intervals of reported altitudes) of aircraft reported altitude in the Mode S environment.

3. The impact of the proposed installation requirement on the Department of Defense (DOD) and on general aviation aircraft owners and operators.

4. The impacts on pilot cockpit workload, awareness of other air traffic, and the vulnerability to errors in altitude reporting in an automated system.

5. The extent of U.S. airspace within which Mode S would be required.

6. The bottom-line services and benefits that Mode S offers users, particularly general aviation users, in the NAS.

On September 17, 1985, the FAA published a Notice of Proposed Rulemaking (NPRM) (50 FR 37674, Notice 85-16) which reflected consideration of the concerns expressed in response to the ANPRM.

1. The NPRM acknowledged that an early U.S. withdrawal of the ATCRBS TSO authorization would likely have an unnecessarily disruptive and adverse economic effect on U.S. manufacturers' international sales of the ATCRBS and in addition an adverse effect on the regulatory and certification processes of foreign countries. To meet the dual objectives of permitting the continued manufacture and sale of ATCRBS transponders for foreign distribution and consumption while accomplishing an orderly domestic phase-in of Mode S transponders, the FAA proposed a schedule of installation requirements applicable only to ATC transponder equipment installed in U.S.-registered civil aircraft. The schedule was as follows:

Mode C automatic pressure altitude reporting equipment would be required in Group II TCA's effective January 1, 1992.

Transponder equipment, except equipment reinstalled in an aircraft from which it was removed for maintenance, would be required to meet TSO performance and environmental requirements in accordance with the following schedule:

1. Through December 31, 1986:

Any class of ATCRBS transponder (TSO-C74b or TSO-C74c), as appropriate; or any class of TSO-C112 (Mode S).

2. January 1, 1987, through January 1, 1992:

Any class of ATCRBS transponder (TSO-C74b or TSO-C74c) if the equipment was manufactured before January 1, 1987; or any class of TSO-C112 (Mode S).

3. After January 1, 1992:

Any class of TSO-C112 (Mode S).

As stated in the NPRM, the revised schedule was seen as providing several options to the U.S. civil aircraft operator. For example, the operator could use a previously installed ATCRBS transponder as long as it could be maintained. Through December 31, 1986, the operator could elect to replace a previously installed transponder or install a newly manufactured or used ATCRBS or a Mode S transponder meeting appropriate TSO specifications. From January 1, 1987, through January 1, 1992, the operator could elect the same options with one restriction. If the operator elects to install a new or different ATCRBS transponder, it must have been manufactured prior to January 1, 1987.

2. With respect to the concerns relative to improved accuracy of altitude data, improved automatic pressure altitude reporting equipment, and reduced quantization of aircraft reported altitude, the FAA agreed there would be benefits from greater precision in automatic altitude reporting. However, the agency maintained that each area would require separate development of the associated technology and procedures; and in each case, the FAA would seek public and industry input on the specific proposal. In addition, the existing equipment and procedures were determined to be fully adequate to support the additional reporting requirements proposed in the NPRM. For the above reasons, and because the suggested improvements were beyond the scope of the NPRM, the FAA determined it would not be appropriate to incorporate such suggestions in the Mode S NPRM. The agency did announce it would consider the institution of separate rulemaking for adoption of the requested improvements.

3. It was also recognized in the NPRM that an early cutoff of the ATCRBS TSO would adversely affect DOD equipage plans for its sizeable fleet. Accordingly, the FAA stated in the preamble to the NPRM that it proposed to permit continued manufacture of ATCRBS transponders to correspond to the DOD Mark XV implementation schedule.

4. The preamble to the NPRM also recognized the concern expressed concerning the adverse effect a "silent" Mode S data link environment would have on overall pilot traffic awareness and pilot workload in the cockpit. Again, these concerns were considered to be well beyond the scope of the NPRM. The FAA stated in the NPRM that in its implementation of data link, the agency would involve the public in its studies of all factors associated with each kind of message being considered for data link.

5. The concerns relative to the impact of Mode S on general aviation were articulated by the Aircraft Owners and Pilots Association (AOPA). AOPA's position was that the benefits of Mode S would accomplish acceptance of Mode S on a voluntary basis and that it should not be mandated. AOPA also questioned the benefits of Mode S to low altitude traffic. AOPA went on record as opposing Mode S if it were mandated above 6,000 feet. AOPA did recognize that the FAA proposal was to mandate Mode S or ATCRBS above 12,500 feet and within TCA's.

FAA responded to the issues of bottom-line benefits, scope of airspace wherein Mode S is proposed, and service capabilities with a summary of the benefits of the NAS Plan. The goals of the NAS plan were broadly presented in the preamble of the NPRM as those designed to meet the pressures of increased demands for aviation services, limit costs, and provide and improve facilities. The preamble further stated that the plan for Mode S is incorporated in the NAS Plan because Mode S is considered to provide the airborne data link capability in NAS. The following excerpts from the NPRM describe in summary the NAS Plan and the role of Mode S in the NAS.

The NAS Plan is a comprehensive plan supported by large increases in automation to yield significant improvements in service and cost savings to the airspace user, the taxpayer, and the ATC system. Cost savings are expected through reductions in delays and fuel consumption due to improved traffic handling capabilities and the increased ability of the ATC system to accommodate direct, pilot-preferred routings. The effectiveness of NAS is expected to be dependent, in great part, upon a surveillance system which can provide accurate position information, relatively interference-free aircraft identity through selective addressing, and automatic pressure altitude reporting equipment. The Mode S transponder, coupled with its associated automatic pressure altitude reporting equipment, is considered a key piece of avionics necessary to participate fully in and receive the benefits of the NAS.

To summarize the role of Mode S in the NAS, Mode S is an advanced secondary radar system expected to provide improved accuracies in the surveillance of aircraft position and more interference-free identity and altitude reports to ATC.

Comments on the NPRM

The NPRM comment period expired December 16, 1985. At the request of the Air Transport Association (ATA), the comment period was reopened. The reopened period extended from February 14 to

March 3, 1986 (51 FR 5686, Notice 85-16). A total of 15 commenters responded during both the original and reopened comment periods. There was general support and acceptance of the proposal. However, those in support of the proposal did express certain reservations and suggestions for improvement. Those in general support of the proposal but with comment and suggestions were the Air Traffic Control Association (ATCA), Air Line Pilots Association (ALPA), Soaring Society of America (SSA), Experimental Aircraft Association (EAA), General Aviation Manufacturers Association (GAMA), Air Transport Association (ATA), the State of Montana, the Aerospace Industries Association of America (AIAA), Rockwell International, and Allied Bendix Aerospace. Those generally opposed to the proposed introduction of Mode S into the NAS were the Aircraft Owners and Pilots Association (AOPA), the National Business Aircraft Association (NBAA), Foster Airdata, and two private citizens.

Issues

A common element in the comments was a perception that the agency is proceeding too quickly in mandating Mode S. Many commenters stated or implied that the FAA is accelerating the Mode S transponder requirement without giving due regard to the need for allowing a reasonable acceptance period on the part of all parties affected. Those identified as being affected by an accelerated transition from ATCRBS to Mode S equipment included the manufacturers who must design, develop, produce, and market Mode S; aircraft manufacturers who design and manufacture their aircraft cockpits to accommodate installation of Mode S; installers; and general aviation owners and operators who will make the ultimate decisions to purchase and install it.

The following are the major issues and related subissues presented in the public comments.

Major Issues—

a. Mode S is costly.

b. The proposed installation schedule for Mode S transponders creates problems for:

—Avionics manufacturers

—Aircraft manufacturers

—Airlines

—Owners and operators who believe they may be forced into making two purchase decisions, an initial one for a surveillance transponder, and a subsequent purchase when added data link services become available. In addition, commenters representing general aviation believe the general aviation operators may be forced into purchasing a transponder whose benefits are questionable.

c. Data link services to be available are indefinite. FAA has made no commitment to data link, causing uncertainty as to when and what services will be available.

Other issues—

There were a number of other issues and subissues raised. They are as follows:

1. There is no justification for automatic pressure altitude reporting equipment in Group II terminal control areas (TCA). On the other hand, other commenters expressed the opposite view. That view was that there is a recognizable need for automatic pressure altitude reporting equipment and its use should be required by separate rulemaking.

2. The recent decline in aviation growth does not bear out original NAS plan estimates and it makes the mandating of Mode S transponders unnecessary.

3. There are deficiencies and problems with the proposed transponder tests.

4. There are performance weaknesses and deficiencies associated with Mode S, data link, and Mode C altitude reporting equipment.

5. Use of Mode S with data link would create a "silent" environment, as opposed to today's "party line" voice communications environment. A silent environment is hazardous to flight safety.

6. The Mode S requirements may adversely affect DOD fighting capability.

7. The U.S. may be breaking International Civil Aviation Organization (ICAO) agreements if it issues a rule without international approval.

8. Issuance of Mode S requirements prior to issuance of the Mode S TSO is premature.

Discussion of major issues.

a. Major issue number 1: Mode S is costly. Generally, concerns were expressed that Mode S transponders could impose a financial burden on the industry and that the FAA seems little concerned

that added costs will have the greatest effect on the general aviation fleet. Major concerns associated with cost were—

(1) Mode S transponder prices, even before data link is added, will be higher, creating a smaller market, which in turn will drive the cost even higher.

The effect of higher prices would be to freeze or reduce the transponder equipage levels at the lower end of the fleet.

(2) Mode S transponders with data link will cost more because they are significantly more complicated and complex.

One commenter said that FAA's finding in its economic evaluation that the difference in cost between the ATCRBS and a basic Mode S transponder would be approximately $600 after a break-in period, was fallacious. This was said to be so because if real-time weather and automated ATC data link communications are the Mode S benefits, a surveillance-only transponder would not be very marketable. In other words, to take full advantage of data link and automation benefits, the Mode S transponder will be considerably more complicated, and therefore more costly, than a surveillance-only transponder.

(3) There may be a need to make more than one buy of a Mode S transponder.

One commenter said that without any real FAA definition of what if any data link services might be available, an operator might at first buy a basic Mode S transponder and subsequently be faced with a decision to buy another more expensive model when and if operationally effective data link services become available. On this issue, the ATA suggested that data link, at least at the basic communications level, should be required by regulatory schedule. This would permit introduction of data link for ATC purposes, without requiring replacement of the basic transponder. It would also permit reasonable investment decisions for equipment to be installed at earlier dates.

(4) Mode S transponders will have a negative cost impact on small helicopters and airplanes, and on the DOD fleet.

This commenter said the DOD would feel a great impact because of its large new fleet which would be introduced during transition to Mode S. The U.S. Army alone has nearly 10,000 helicopters now, most of which are being replaced by new helicopters which could be required to carry advanced navigational capabilities of ATCRBS and Mode S equipment. The commenter concluded that the proposed requirement seemed to be excessively redundant and expensive.

Discussion of cost issue.

Under the narrow-demand, higher-price, and resultant equipage-freeze theory, the industry would produce fewer transponder options if there is a narrow base of demand, focusing on the higher end of the market (with built-in data link). FAA discussions with marketing representatives of two manufacturers of transponder equipment did not support this scenario. Both companies advised they expect to continue to produce mainly for a major portion of the market. They do not expect any significant contraction in the demand for their transponders in the 1990's in large part because of the expected existence of a substantial retrofit market. With regard to the market as a whole, although there has been a dramatic decline in the production of general aviation aircraft in recent years, the size of the total fleet and the number of hours flown have remained fairly constant or increased somewhat. Furthermore, the manufacturers have the freedom to produce basic Mode S equipment that will be upgradable or have data link capability, thereby enhancing its attractiveness to potential purchasers of smaller aircraft.

Some commenters noted that the price difference quoted in the rule between Mode S and ATCRBS transponders does not include data link and that there are very few or no advantages for a Mode S transponder without data link. The manufacturers' ability to produce basic, upgradable equipment, as expressed above, is expected to help resolve this problem.

With respect to the issue of basic Mode S advantages/disadvantages, the FAA recognizes that data link is a major benefit of equipping with a Mode S transponder. The agency also believes that most users will eventually opt to equip with data link. There are however, two basic advantages of Mode S transponders that accrue to users that derive from the capability to enhance ATC services. One is the unique address portion of the Mode S transponder which makes possible the automatic association and display of the transponder reply with aircraft registration on the ATC radar scope. The other is that when a Mode S transponder operates with a Mode S ground system, certain kinds of radio interference present in high-density traffic environments are reduced below the level experienced with an ATCRBS transponder. Not all of the garbling problems with the ATCRBS transponders and ATCRBS ground station can be eliminated by upgrading the ground station or the transponder.

There is also more to the cost issue when considered in conjunction with Mode S with data link capability. The FAA had considered a requirement that would have included some level of data link with every Mode S transponder, but rejected it for two reasons. First, the agency believes that most users desire that the device mandated by the rule be as simple as possible—a number of commenters obviously preferred a device even simpler than Mode S. Second, FAA believes that a rule mandating data link would unnecessarily limit the flexibility of manufacturers to develop a range of capabilities. That range might be described as follows. At bottom is the user who is aware of the benefit of improved ATC surveillance, but has no use for the kinds of information envisioned for data link. A middle range may be the visual flight rules (VFR) operator with a simple display device to obtain weather services through data link. At the top of the line, one might find a frequent instrument flight rules (IFR) operator needing display, a touch entry device, or even a printer to make a permanent record of data link messages to obtain weather and ATC services. By not making data link mandatory, the flexibility to meet these needs is retained as determined by the marketplace and designers' innovations.

Comment regarding negative cost effects of the Mode S proposal on the DOD was not submitted by the DOD, but by private citizens. The DOD did not reply to the NPRM during the comment period but has since advised that it concurs with the proposal. In any event, under the transponder installation requirements of Section 91.24(a), the proposed Mode S requirements pertaining to transponder installations apply only to U.S.-registered civil aircraft.

b. Major issue number 2: the proposed installation schedule for Mode S transponders creates problems for avionics and aircraft manufacturers, airlines, and aircraft owners and operators. The major concerns expressed in this area were—

(1) Effects on avionics manufacturers. One of the proposal's alleged negative effects to avionics manufacturers was stockpiling. The NPRM proposed that an ATCRBS transponder could continue to be installed in a U.S.-registered civil aircraft after January 1, 1987, but only if it were manufactured before that date. Rockwell International commented that an effect of this requirement would be that manufacturers would have to stockpile ATCRBS transponders for 5 years (from January 1, 1987, to January 1, 1992). Stockpiling was also brought out by another commenter relative to the concerns expressed regarding production problems.

Another alleged negative effect to avionics manufacturers was that the proposal did not allow time which would be needed to design, develop, and produce Mode S transponders. Allied Bendix stated that the ATCRBS production must be moved closer to the January 1992 deadline. Since the typical product development cycle was said to be 18 to 24 months, Allied Bendix recommended that ATCRBS production cutoff for non-U.S.-registered civil aircraft should be 24 months prior to the Mode S implementation deadline. The ATCRBS production cutoff should then be December 31, 1989, if the January 1992 deadline were retained. Allied Bendix commented this would allow availability of equipment which incorporates the latest technology coincident with a market that would justify the investment required to introduce a new product. Otherwise, the company maintained it was left with the choice of either stockpiling ATCRBS transponders or foregoing this market opportunity.

In still another area of negative effect, a manufacturer said that because Mode S transponders would be more complex, they would be more expensive. Therefore, it would be more likely that ATCRBS transponders would be installed up to the 1992 deadline or until the supply of pre-January 1, 1987, transponders was depleted. A consequence of this would be that the onset of a general aviation market for Mode S transponders would be very uncertain.

(2) Effects regarding general aviation. There were several alleged negative effects of the proposal to general aviation, most of them associated with the cost/benefit issue. The NBAA maintained that owners in the lower-price end of the fleet would not equip with a transponder at all when faced with the unavailability of low priced ATCRBS transponders and no expectation of flying above 12,500 feet MSL or in TCA's.

On another related subissue, NBAA said that new hardware and software are 5 to 10 years in the future, and possibly even longer for the lower-price end of the general aviation market. Accordingly, the only foreseeable service that would convince the lower-price portion of the market to buy Mode S is improved real-time weather services.

Although not expressed in terms of specific effects to general aviation, the AOPA submitted several objections to the Mode S proposal questioning the value of Mode S primarily in terms of benefits and cost. In terms of benefits, AOPA submitted that while there may be some small incremental improvement in surveillance from use of Mode S, most, if not all, of the surveillance accuracy improvement will be attributable to the Mode S ground sensors and not the Mode S transponders. Accordingly, the FAA

should permit sufficient time after Mode S ground sensors are operational for an objective evaluation of their value prior to forcing an airborne transponder retrofit to achieve a marginal improvement in accuracy. AOPA's other concerns with the impact to general aviation owners/pilots were expressed in terms of cost. For example, AOPA reiterated the concern that Mode S transponder prices would be higher. As a result, purchases would be down, essentially freezing equipment levels in the low end of the fleet. These concerns are discussed under the cost issue above.

Comments of the SSA noted the effects of the proposal on general aviation with respect to consumer choice. SSA agreed with AOPA that service benefits of Mode S, rather than regulation, should be relied upon to motivate pilots to upgrade their equipment. Mode S services must be made available to general aviation aircraft operating below 10,000 feet MSL and not be reserved for jet-powered, high-altitude traffic. For this reason, Mode S should not be made mandatory after January 1, 1992. SSA concluded that ATCRBS should be permitted to be manufactured and installed as long as it does not interfere with either the surveillance system or services.

With respect to what was perceived as an unjustified installation requirement of Mode S transponders, the lack of consumer choice was an issue raised by two other commenters. One comment was that Mode S development will require at least 2 years from the availability of TSO-approved Mode S airborne equipment. The commenter referred to the NPRM which stated that only one Mode S ground radar is expected to be operational by 1988 at an unspecified location. Another commenter voiced a similar concern by saying that under the NPRM, users will be forced to equip with airborne Mode S before the ground stations can provide the same coverage as the older ATCRBS. The commenter's conclusion was that FAA's plan for forcing airborne Mode S equipage is premature.

(3) Effects on aircraft manufacturers. One commenter pointed out that because of technical parameters and data link capability, the Mode S transponder is not physically interchangeable with the ATCRBS transponder and, therefore, current aircraft designs cannot accept Mode S. The commenter suggested that new radio rack mounts, new control panels, new wiring, new cooling, and an additional antenna are needed to accommodate the new installation.

The problem facing manufacturers was also raised by several commenters as a retrofit problem for aircraft operators. Several commenters maintained that a formidable effect of the Mode S proposal would be the problem of retrofitting Mode S transponders in cockpits not adequately designed to accommodate the new equipment. One said that current aircraft designs do not accept Mode S. Installation design changes will be necessary and a development flight test will be required to assure antenna locations and operating characteristics are acceptable. Another suggested that retrofitting of older aircraft should remain voluntary except for aircraft operating in those areas where radar coverage is degraded by high-density traffic.

(4) Effects on airlines. The ATA advised that the proposed installation schedule would affect airlines. When a transponder is removed for maintenance, airlines routinely replace it with another unit and do not reinstall the same transponder equipment in the same aircraft each time.

The defective box is taken to the avionics shop for repair and subsequently installed in a different aircraft within the fleet. Under the proposed January 1, 1987, cutoff date associated with ATCRBS transponders, airlines would be required to retrofit all aircraft prior to the January 1, 1992, Mode S date.

Discussion of installation issues.

The FAA believes that most of the concerns of and effects upon the avionics and aircraft manufacturers, owners/operators, consumers, and airlines can be alleviated by—

(a) changing the last manufacturing cutoff date for ATCRBS transponders which may be installed in U.S. aircraft from December 31, 1986, to December 31, 1989. The additional three years will provide an extended time period within which affected users may effectively plan for transition from ATCRBS to Mode S;

(b) modifying the installation requirements so that—

(1) a transponder that meets requirements of TSO C74b or TSO 74c, and that is manufactured before January 1, 1990, may be removed from an aircraft for maintenance and/or repair, and then be reinstalled on the aircraft from which it was removed. Also, a correctly functioning transponder which meets the requirements of the appropriate TSO may be installed on the aircraft temporarily while the malfunctioning transponder is being repaired.

(2) for fleet operations, a transponder that meets the requirements of TSO C74b or TSO C74c may be removed from an aircraft for maintenance and/or repair, and then be installed on either the

aircraft from which it was removed or on another aircraft in the same fleet. Equipment transferred among fleet aircraft will be considered permanent equipment and not "substitute equipment" under the provision for temporary replacement sets. Accordingly, any equipment installed for the first time in an aircraft of a particular operator's fleet after January 1, 1992, must meet the requirements of TSO-C112 (Mode S).

The FAA believes that the above changes to the installation requirements which appear in the final rule may be expected to:

(i) Eliminate the problem of stockpiling.

(ii) Clarify onset of a Mode S market.

(iii) Allow time for aircraft manufacturers to ensure that new aircraft designs provide adequate space, wiring, etc., to accommodate Mode S equipment; and

(iv) Allow time for operators/consumers to plan for retrofitting which is not mandatory but which could take place in the 1990's as owners/operators consider replacement of ATCRBS transponders.

With respect to the issue of the reluctance to install a Mode S transponder because of associated increased costs, the FAA views as insignificant any disincentive to buy a Mode S transponder because a basic unit costs more than it does today. Most voluntary transponder equipage is due to the perceived benefit in obtaining ATC services. Those services will continue and will be enhanced with Mode S. We believe that users will see that cost as being justified. If some users do not see it as being justified, the rule provides ample time for low end users to equip with ATCRBS transponders, the life of which should extend to near the end of the century.

The proposed rule did not expressly provide for the use or installation of ATC transponders which were manufactured under TSO-C74 or TSO-C74a. The existing rule requires that transponders installed after January 1, 1974, or used after July 1, 1975, meet the requirements of TSO-C74b or TSO-C74c. However, the use of the TSO-C74 and TSO-C74a equipment after July 1, 1975, could be approved by the Administrator if the operator submitted data showing that the equipment met the performance standards of the appropriate class of TSO-C74c and environmental conditions of the TSO under which it was manufactured.

Any equipment which qualified under this provision would be more than eleven years old at this time. While the rule adopted does not make specific provision for such equipment, the FAA will permit the continued use of any equipment manufactured under TSO-C74 or C-74a, if still in use, if that equipment meets the performance standards of TSO-C74c and the environmental standards of the TSO under which it was manufactured.

(c) Major issue number 3: Data link services to be available are indefinite; they lack FAA commitment; operators do not know what data link services will be available nor when. Uncertainty in this area is also likely to be costly to consumers faced with a decision to purchase Mode S transponders (the latter part of this issue is discussed under the cost issue).

Several commenters noted that the FAA made no commitment in the proposal to data link applications, even though data link was put forth as one of the basic benefits to come from the Mode S transponder. Moreover, to obtain the benefits of data link, more equipment would be required, e.g., displays, printers, and input/output devices. This leads to cost and retrofitting problems. The AOPA commented that any forced transition to Mode S transponders should begin only after the FAA, in concert with the aviation user community, has decided what services will be provided on the data link and has created a plan which ensures that investments in equipment to obtain those services will be justified.

Discussion of the data link issue.

While the FAA has not to date issued any rulemaking or technical standards specifically relating to data link, the agency is now engaged in preparation of a data link master plan and the development of a data link program. The FAA expects that informational data link services will be available within a year of the first operational Mode S sensors. In addition, the FAA agrees that there is a need to stimulate aircraft owners to purchase Mode S transponders by accelerating data link development. Data link development to date has been system oriented and has concentrated on the NAS components that are necessary for data link. Agency personnel are meeting with user groups to develop implementation priorities and a schedule which is compatible with the Mode S transponder rule schedule.

With regard to the products and services that the FAA expects to have available for users, the FAA objectives are to—

(a) Develop and implement data link applications which improve aviation safety and efficiency and stimulate Mode S transponder equipage;

(b) Provide data link services at the earliest date that equipment and data base availability permit; and

(c) Provide a focal point for all domestic and international aviation data link standards.

Weather information is currently scheduled to be the first data base available. Therefore, weather services are expected to be the first group of services offered using Mode S data link. The initial set of potential services within this group are terminal forecasts, surface observations Automated Surface Observation System data, Automated Weather Observing System data, winds aloft forecasts, pilot reports, radar summaries, and hazardous weather advisories. The initial implementation of these services may be on a request/reply basis. As the system matures, these services can be provided to a pilot in a more automated manner.

The second group of potential services expected to be available are expanded weather and airport services. These include the Automated Terminal Information System, wind shear alerts, and runway surface winds.

The third group of potential applications expected to be available are initial ATC services. These applications include transfer of communications, altitude assignment confirmation, flight identification, minimum safe altitude warning, traffic information, and uplinking of aircraft position data.

The fourth group of potential applications expected to be available are dependent on the implementation of the advanced automation system. These applications include en route metering, automatic flight service hazardous weather, weather graphics, and clearance delivery.

Each of the above groups of services depends upon specific equipment and data base availability. The indicated order of group implementation reflects the current FAA schedules. The implementation schedule of a data link application within a group depends upon its acceptance by the users and the maturity of the concept. One of the data link program objectives is to provide the greatest number of data link services in the shortest time span.

In regard to the issue of requiring data link, the FAA had considered specifications that would have required some level of data link with every Mode S transponder, but rejected it for two reasons. The basis for rejection was that most users desire the simplest device possible; and secondly, FAA believes that a rule mandating data link would unnecessarily limit the flexibility of manufacturers to develop a range of capabilities that was described under discussion of the cost issue. In consideration of manufacturers' opinions in this area, the FAA has retained the manufacturers' flexibility to meet these needs in accordance with the marketplace and product innovations and not by regulation.

Discussion of other issues.

Issue number 1: The need for automatic pressure altitude reporting equipment.

The NPRM proposed an effective date for requiring Mode C equipment in Group II TCA's of January 1, 1992. For reasons discussed below, the FAA has adopted an effective date in the final rule of December 1, 1987. The basic justification for extending the requirement to Group II TCA's remains the same. The comments which addressed the Mode C issue focused on the need for Mode C in Group II TCA's and on the inclusion of Mode S and Mode C requirements in the same rule, but not on the implementation date for the Mode C requirement.

AOPA opposed the use of Mode C in Group II TCA's saying the FAA had not provided a rationale for extending the use of Mode C transponders to additional airspace. AOPA believes there is little evidence to show that it can help to improve ATC system safety and challenged FAA claims that Mode C would increase ATC effectiveness through greater selectivity in viewing targets or that it would reduce the number of traffic advisories or avoidance vectors. AOPA said that TCA's should be considered individually, and rulemaking action should be taken if it becomes clear that a location warrants such exclusionary provisions based upon traffic volume, complexity, aircraft mix, controller workload, and frequency congestion.

In another view, two commenters said that it would be inappropriate to include two complex issues in one rule, and that Mode S and Mode C should be handled by separate rulemakings.

The FAA does not agree that the use of Mode S transponders and automatic pressure altitude reporting equipment should be separate rulemaking actions. The required use of altitude reporting

equipment in Group II TCA's is not a separate issue; rather, it is an extension of its current application in Group I TCA's and above 12,500 feet MSL. Neither can its use be regarded as separate and unrelated to the use of Mode S transponders since its use will logically be required in the same airspace areas where Mode S transponders will be required. Automatic pressure altitude reporting equipment has been required and has been in proven use in conjunction with ATC transponder equipment in Group I TCA's and above 12,500 feet MSL since 1973. The equipment has been used to provide essential aircraft identity, location, and altitude information in those airspace areas where such information provides a fundamental base in providing airspace users safe, orderly, and efficient use of available airspace.

Experience has shown that Mode C has been particularly beneficial in the higher density TCA airspace environment. It was in consideration of this environment that Task Group 1-2.1 of the National Airspace Review (NAR) recommended use of Mode C to reduce radio frequency congestion. The task group's rationale, as stated in Notice 85-16, was that this reduction was necessary to create more efficiency within the system thereby increasing capacity while providing an increased level of safety over operations with non-Mode C aircraft. In particular, the group pointed to weather conditions which cause pilots of VFR aircraft to change altitude to maintain appropriate separation from clouds. In a high density environment, this altitude change is not immediately forwarded to the controller. However, the Mode C readout on the controller's radar display does provide this information. The task group's conclusion was that in busy, complex areas with high concentrations of traffic, a continuous readout of aircraft altitude is a necessity for maintaining a continuous three-dimensional (range, azimuth, altitude) view of the traffic picture.

The FAA concurs with the finding of the NAR task group. The FAA also recognizes that the NAR task group envisioned use of Mode C equipment within a single class of TCA whose proposed establishment criteria were somewhat lower than current Group I TCA criteria and somewhat higher than current Group II criteria. Although the NAR task group related the Mode C requirements to a single class of TCA, the FAA expects similar benefits from use of Mode C in the airspace environment of today's current Group II TCA's. That environment is examined in more detail below.

The designation of a terminal area as a Group II TCA indicates that it is a higher density terminal area which presents complex air traffic conditions resulting from a mix of large turbine-powered air carrier aircraft with other aircraft of varying performance characteristics. There is no reason to believe that the complex nature of a high-density environment, as typified by a Group II TCA, will be altered by slower than expected growth in traffic or even the unlikely event of a sustained static level of traffic into the next decade and beyond. The requirements of the Group II TCA are basic to that environment and they are essentially common to the requirements of a Group I TCA. Furthermore, the requirements are generic in the sense that they could apply to any classification of airspace with similar characteristics. They are requirements designed to afford the greatest protection for the greatest number of people by providing ATC with an increased capability to provide aircraft separation service to minimize the hazardous mix of controlled and uncontrolled aircraft.

The amendment adopted prohibits operation in a Group II TCA without operating Mode C equipment, effective December 1, 1987. The requirement adopted is the same as that proposed in the NPRM except for the earlier implementation date. In consideration of the benefits of having each aircraft in TCA airspace equipped with Mode C, as discussed immediately above, the FAA believes that this requirement should not be postponed to 1992 as originally proposed. In addition, one or more other rulemaking projects under consideration by the FAA at this time would almost certainly have the effect of requiring Mode C in Group II TCA's long before January 1, 1992. These actions include:

- The establishment of a single category of TCA, in which Mode C would be required. This action was recommended by the NAR and also by a TCA Review task group established by the FAA in September 1986, and is part of the airspace reclassification rulemaking now in progress (FAA Docket No. 24455, 50 FR 5055; Docket No. 24456, 50 FR 5046, February 5, 1985).
- The requirement for use of a traffic alert and collision avoidance system (TCAS). The FAA has announced its intention to issue an NPRM by November 1987 proposing to require the installation and use of TCAS equipment by certain operators. The TCAS II system to be proposed will issue traffic alerts for conflicting aircraft equipped with transponders, but will issue conflict resolution advisories only for aircraft equipped with Mode C.

Also, the FAA has received separate petitions for rulemaking, from the Air Line Pilots Association and the Air Transport Association, requesting that the requirement for Mode C equipment be extended to additional terminal areas and other airspace. The FAA has not acted on either petition at this time. Finally, language included by the House Committee on Appropriations in the report on a recent spending resolution (H.J.Res. 730) stated the committee's intent that the FAA substantially expand the airspace in which Mode C equipment is required.

Requiring Mode C equipment in Group II TCA's effective December 1, 1987, rather than January 1, 1992, advances the date by which some operators must acquire Mode C but does not otherwise alter the requirement proposed in the NPRM. The equipment required is common avionics equipment now installed on the aircraft used by most Part 121 and Part 135 operators and many general aviation operators. An adjustment in the implementation date from 1992 to 1987, therefore, does not present any new issues with respect to availability of equipment or costs to operators.

In summary, the FAA believes the benefits of a Mode C requirement in Group II TCA's clearly support the implementation of that requirement at the earliest practical time. An effective date of December 1, 1987, will provide affected operators sufficient time to acquire the Mode C equipment if necessary. The issues related to the expanded Mode C requirement were presented and discussed in the NPRM and the comments received, and the agency has determined that further notice is not required.

Issue number 2: There has been a decline in aviation growth that does not bear out NAS estimates and which makes the mandating of Mode S transponders unnecessary. AOPA said it is clear that the traffic projections upon which the NAS Plan was based in 1980 substantially exaggerate the growth and density of aircraft in the U.S. fleet. The increases suggested will not happen, and any transponder mandate based on those forecasts is misguided at best.

The initial estimate that 19.9 billion in cost savings or benefits over the years 1981-2000 is expected to result from NAS improvements was derived on the basis of a 1981 equivalent system. In other words, the improvements of the NAS were quantified by estimating the cost savings expected to result from a reduction in delays, improved fuel-efficient routing, reduced accidents, and reduced operating and maintenance costs, using as a baseline for comparison the higher expected costs of operating and maintaining the 1981 system in a manner to provide the same level of service to more aircraft. The extent of these benefits was estimated on the basis of the projected increase in traffic levels over the years 1981-2000, which in turn are based on projected increases in the active fleet. The benefits of Mode S estimated in the initial economic evaluation were based on fleet projections made in early 1985 rather than in 1980-81, as the commenter apparently believes was the case. The 1987 projection, which was just released, takes account of declining production trends in general aviation aircraft over the past 5 years as it forecasts a total of 219,300 airplanes in this category as of the year 1998, which is about 40,000 lower than last year's projection. The 1986 estimate of NAS improvement benefits has been reduced to 16 billion mainly to reflect the lower forecasts of aviation activity. The reduction in the fleet of about 15 percent is considerably less than the 50 percent decrease cited by one commenter and has had a proportionately smaller downward effect on the magnitude of expected benefits. In any case, the benefits of an upgraded NAS that were estimated 1 year ago are likely to be realized eventually even if the underlying forecast may have been too optimistic, because the total civil aviation fleet is still expected to increase over the foreseeable future if at a slower pace.

Issue number 3: There are deficiencies and problems with transponder tests. Several concerns were raised in this area. One commenter said there would be increased reliance placed on future transponders, especially on data link; therefore, there is a question whether the frequency with which ATC transponders are required to be tested is adequate.

In reference to the proposed additional testing of transponder output power, another commenter said that unless the FAA can demonstrate that inadequate output from current transponders is causing a degradation in system performance, this part of the rule should not be adopted.

AOPA stated that while it supports the transponder test requirements, the length of time between inspection and test could easily be extended from 24 to 36 months. Inspections conducted at that interval would assure proper operation, but would offset the increased cost of performing the more complex tests both for Mode S and ATCRBS devices.

The current transponder tests and inspection requirement are based on the experience gained with the ATCRBS transponders. At this time, the FAA has no data to substantiate either increasing or reducing the frequency of transponder tests and inspections. Prior to the implementation of the data link, the FAA expects sufficient experience with the Mode S transponder to determine if the frequency of testing should be changed.

The FAA believes that the additional testing of the transponder output power is necessary because it is obvious that inadequate output from transponders degrades the air traffic control system performance. If a transponder does not have sufficient output power to respond to an interrogation, the ATC system does not obtain identification of the aircraft.

The FAA does not concur with the AOPA suggestion that the length of time between inspection and tests could be extended from 24 to 36 months. The FAA has no data to support such a change. Older transponders, without solid-state output, tend to degrade in performance over time. Increasing the length of time between tests and inspection could result in some transponders being out of tolerance for longer periods of time.

Issue number four: There are performance weaknesses and deficiencies associated with Mode S, data link, and Mode C altitude reporting equipment.

Commenters alleged several technical deficiencies and weaknesses with the equipment with respect to both Mode C and Mode S equipment. One commenter said that the current trend to monopulse secondary surveillance radar (SSR)/monopulse ATCRBS may be jeopardized by the addition of any form of Mode S transponders in the airspace using the same ICAO radio channels, because, according to an in-depth British study, angular errors will increase. Another commenter said the Mode S proposal includes the likelihood of a degradation of the primary function of the radar beacon system in its mission of air traffic monitoring and ATC operations. The data rate of message exchanges is restricted by the radar antenna sweep rate which will limit message exchange windows to 120 milliseconds duration at 12 second intervals for en route and 40 milliseconds for terminal radars. Another commenter believes the FAA should defer the Mode S issue until it is proven that the ATCRBS/SSR Mode C, using monopulse techniques now being developed in Europe in the interest of greater accuracy, can no longer meet the national ATC needs.

Concerning the accuracy of Mode C altitude reporting equipment, AIA stated that there is a major problem with altitude reporting accuracy that has not been solved by Mode S; i.e., barometric altitude. Another commenter recommended that the FAA undertake, on a high priority basis, a research and development project to develop an accurate altimetry system to ensure that altitude reports by either ATCRBS or Mode S users will in fact be accurate altitudes. The commenter went on to say that to mandate a whole new system based on present altimetry techniques is premature and a shameful waste of money.

With respect to data link, one commenter maintained that data link hardware for the cockpit is yet to be determined. The packaging and human factors features are not specified. Manufacturers must determine how data will be uplinked and downlinked. Questions remain unanswered. In slightly different language, the ATA said that even though the characteristics of the Mode S transponder are reasonably well defined, the extent to which the data link functions may impact the hardware design is less clear. ATA concluded that it seems appropriate that FAA adjust the dates for transition to Mode S until the airborne architecture for Mode S data link has been firmed up.

Concern regarding need for improved accuracy of altitude data and improved automatic pressure altitude reporting equipment was one of the issues to surface from the original ANPRM. As stated in the NPRM and repeated earlier in the preamble to this rule, the FAA agreed there would be benefits from greater precision in automatic altitude reporting. However, this increased precision would require separate development of the associated technology and procedures. In each case, the FAA would seek public and industry input on the specific proposal. This continues to be the agency position on this issue. Also, in accordance with the previous position on this matter, the FAA believes the existing equipment and procedures are fully adequate to support additional reporting requirements proposed in this notice. The agency will consider the institution of separate rulemaking in the future for adoption of the requested improvements.

The introduction of Mode S transponders is not expected to affect adversely the introduction of monopulse ATCRBS or the angular measurement accuracy of air traffic monitoring operations. The compatibility of ATCRBS with present and future enhancements was considered by the International Civil Aviation Organization (ICAO) in its Secondary Surveillance Radar (SSR) Improvements and Collision Avoidance Systems Panel (SICASP). The panel approved a recommendation at its first meeting recognizing that compatibility had been demonstrated to exist between Mode S and ATCRBS. The panel further recommended that ICAO ensure the maintenance of compatibility of future SSR enhancements in the formulation of standards relating to these enhancements. The recommendation was subsequently accepted by ICAO.

With regard to data link concerns, the FAA believes that the revised Mode S installation schedule will also help provide for a longer transition period to develop and test equipment and procedures, validate benefits, and implement associated data link applications and procedures. Concerns regarding the uses, systems, practices, or procedures involving data link will be addressed through the appropriate procedures of FAA's data link program as evaluation data becomes available. These concerns therefore will not be addressed here since they are beyond the scope of this rule which is limited to the use, testing, and installation of ATCRBS/Mode S transponders.

Issue number 5: Use of Mode S with data link would create a "silent" environment, as opposed to today's "party line" voice communications environment.

According to one commenter, a silent environment is hazardous to flight safety. The commenter said the silent nature of the Mode S data link can lead to sending a message in error which, if undetected, can lead to a fatal accident. Currently, all pilots hear ATC instructions to all other proximate pilots and can catch inconsistent instructions to different aircraft in the same area. The party line would be lost if this rulemaking takes effect.

Contrary to the commenter's perception, the "party line" would not be lost as a result of this rulemaking. Though presented as a major benefit, data link is not being mandated by this rule. This same concern was expressed in response to the original ANPRM and responded to in the subsequent NPRM. These concerns were considered to be well beyond the scope of the NPRM. The FAA stated in the NPRM that in its implementation of data link, it would involve the public in its studies of all factors associated with each kind of message being considered for data link. This continues to be the FAA's position. The FAA recognizes there are advantages and disadvantages to both the party line and data link messages. The benefits to any data link service must outweigh the disadvantages before implementation. One of the objectives of the FAA's data link applications program will be to investigate the feasibility and desirability of providing some of the "party line" information which currently serves to congest voice frequencies over data link. Frequency changes are an example. If frequency changes were removed, voice channels are expected to be less congested, providing more time for users to better monitor other party line information.

Issue number 6: The Mode S requirements may adversely affect DOD fighting capability.

Two commenters believed that the DOD's fighting capability would be diminished by the Mode S rule. The impact of the Mode S transponder rule on the DOD was discussed earlier in this preamble under the major issue of cost. In that discussion, it was stated that comment regarding negative cost effects of the Mode S proposal on the DOD was submitted by private citizens. Even though the proposal did not apply to military aircraft, the DOD has advised the FAA that it concurs with the proposal and is voluntarily incorporating Mode S in its Mark XV transponder. In summary, the DOD has expressed no concerns that mandating Mode S transponders would adversely affect its mission.

Issue number 7: The U.S. may be breaking ICAO agreements if it issues a rule without international approval.

A commenter said that it appears from study of the ICAO charter, to which the U.S. has agreed, that no nation will unilaterally impose rules regarding avionics in its airspace which is available via bilateral ICAO agreement with at least 50 other nations. Another commenter stated that the U.S. should defer implementation of a Mode S requirement until there is full agreement in the ICAO that Mode S is essential and that states are permitted to mandate its use for aircraft of all nations. The U.S. cannot afford an ICAO confrontation.

In regard to the ICAO issue—

(a) There will be no conflict with ICAO. The installation requirement pertains only to U.S.-registered civil aircraft.

(b) If ICAO believes Mode S is unnecessary, it may consult with the U.S., possibly through SICASP, and make a recommendation.

Issue number 8: Issuance of Mode S requirements prior to issuance of the Mode S Technical Standard Order is premature. This point was made by seven commenters before the December 16 comment deadline date for the Mode S NPRM. At that time, the FAA had not as yet issued a Mode S TSO. However, on February 5, 1986, the FAA issued the Mode S TSO, TSO-C112, "Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment."

ECONOMIC EVALUATION

The following is a summary of the regulatory evaluation associated with this rule. The complete evaluation is in the public docket for inspection.

This rule involves some costs and benefits. There are three aspects of the rule which may have potential economic impacts:

1. The requirement for use of automatic pressure altitude reporting equipment in Group II TCA's after December 1, 1987.
2. The basic Mode C and Mode S transponder and maintenance requirements.
3. The change to maintenance tests for the ATCRBS transponder.

Group II TCA Requirement

The proposal for altitude reporting equipment within Group II TCA's has an effective date of December 1, 1987. Current regulations require only a 4096 code transponder (ATCRBS) within Group II TCA's. The basic transponder does not have the automatic altitude reporting capability associated with Mode C, which is an add-on piece of avionics compatible with nearly all transponders currently in use. There has been a steady trend toward increased equipage in the general aviation fleet with both ATCRBS tranponders and Mode C capability over the past decade. FAA national data reveal that by 1984, about 80 percent of the general aviation (including the commuters and air taxies) was equipped with an ATCRBS transponder and that about one-half of these transponders had Mode C capability. In estimating the cost of this new requirement, the FAA assumed that only those aircraft which presently operate in Group II TCA's and are not equipped with Mode C would be affected. The FAA determined that the cost (discounted) of equipping the 2,368 aircraft that would be affected by this requirement would amount to $1.9 million. In addition, the incremental testing costs associated with Mode C are expected to amount to about $333,500 over the next five years. None of the major air carriers would be affected by this requirement.

There are safety and efficiency benefits associated with the proposal, but they are not quantifiable. Those benefits would result from improved aircraft control within Group II TCA's. Although there is no realistic method for allocating a portion of the overall NAS benefits ($16 billion) to the Mode C regulatory proposal, one can reasonably conclude that the likely benefits would far exceed the associated one-time costs of $1.9 million and recurring cost of $335,000 in view of the central role envisioned for Mode C in the overall NAS Plan.

Mode S Transponder Requirements

The regulatory cost of the Mode S proposal can be developed by estimating Mode S installations and multiplying this forecast by an estimate of the net cost of compliance.

Forecast of Installations

Installations of Mode S transponders are forecast to begin in 1988, with only 10 percent of new installations being Mode S that year, but increasing to 100 percent in 1992. Total transponder installations are estimated as the net annual increase in active aircraft in forecast years, plus 3 percent of the previous year's active aircraft. Using FAA forecasts for future years (FAA Aviation Forecast, February 1987), installations of Mode S transponders would exceed 6,000 in 1992 and average approximately 6,500 a year for the decade from 1991 to the year 2000.

Net Cost of Installation

The added cost per unit for a Mode S transponder, compared to projected transponder equipage in the absence of this regulation, is expected to be approximately $600, installed. This cost estimate assumes installation of a Mode S surveillance transponder with data link connectors, but not the cost of data link processing or display capability. Data link capability could be integrated into the transponder or added later. The price for a Mode S transponder will be about $1,000 more than for an ATCRBS Transponder for about 4 years to account for recovery of development costs.

Based on these assumptions, the regulatory cost of the Mode S proposal for the period 1988 thru 2000 is $21.2 million on a discounted cost basis.

Benefits of Mode S

Mode S is a major component of the NAS Plan. There are many benefits of Mode S, and all are associated with the benefits of the NAS Plan implementation. The benefits of the NAS Plan implementation have been estimated at almost $16 billion in cost savings through the year 2000, due to system operations and maintenance costs, as compared to the "1981 equivalent" systems. There is no reasonable way to allocate a portion of the overall NAS benefits to the Mode S regulatory proposal, but Mode S is considered necessary to successful implementation of the NAS Plan.

Transponder Maintenance Tests

There are additions to Appendix F of Part 43 which provide for tests appropriate for Mode S transponders. There is also an added power output test required for ATCRBS transponders. This test should not involve significant additional costs. The Mode S inspection costs are expected to be moderately higher. Assuming the cost of the Mode S biennial test will be moderately higher than today's tests, any offsetting benefits are in the same general category of general NAS benefits and cannot be specifically allocated to Mode S.

CONCLUSION

Estimated costs of the Mode C requirement in Group II TCA's are $1.9 million for equipment and approximately $333,500 over the next five years for testing. Estimated cost of the Mode S transponder requirement from the year 1988 through year 2000 is $21.2 million on a discounted cost basis. Additional costs of required periodic testing of the Mode transponder will not be significant. The benefits of the Mode C, Mode S, and associated testing requirements adopted in this rule are difficult to quantify, but all are essential components of the NAS Plan. Implementation of the Plan is estimated at almost $16 billion in cost savings through the year 2000. In addition, if one midair collision involving a medium size airliner is prevented by any of the requirements adopted, the additional benefit would be approximately $61,508,000 on a discounted cost basis (based on an accident involving 110 fatalities). Therefore, the FAA has concluded that the benefits of the rules adopted substantially exceed the regulatory costs of those rules.

For the reasons set forth in the above regulatory evaluation summary, the FAA has determined that the rule does not involve a major rule under Executive Order 12991. The Department of Transportation has determined that the rule is considered a significant rule under DOT Regulatory Policies and Procedures (44 FR 11034: February 26, 1979). A copy of the Regulatory Evaluation prepared for this action is contained in the regulatory docket, and a copy may be obtained by contacting the person identified under the caption, "FOR FURTHER INFORMATION CONTACT."

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress in order to insure, among other things, that small entities are not disproportionately affected by Government regulations. The RFA requires agencies to review rules which may have a "significant impact on a substantial number of small entities." For purposes of RFA, small entities are considered to include small businesses, non-profit organizations, and municipalities but not private individuals. As discussed above under "Economic Evaluation," the FAA concludes that the number of small entities affected by this rule will not be substantial in relation to all aviation-related small entities. In addition, the impact on most such small entities will be substantially less than the threshold for significant impact under agency guidelines. Therefore, I certify that, under the criteria of the Regulatory Flexibility Act, this rule will not have a significant impact on a substantial number of small entities.

SUMMARY OF FAA ACTIONS

Consistent with FAA's plan to modernize the NAS, and the planned role of the Mode S surveillance system in the NAS, the FAA is taking or has taken the following actions:

1. *Issue a TSO for airborne Mode S Transponder.* Concurrently, TSO authorization to manufacture ATCRBS transponders will continue in effect. The intent of continuing the ATCRBS TSO is to allow continued manufacture of ATCRBS transponders for foreign sale and for installation in aircraft destined for foreign countries and to accommodate the DOD.

Issuance of the TSO's is not accomplished through rulemaking and, therefore, the Mode S TSO is not a regulatory portion of this rulemaking package. However, consistent with FAA practice, the proposed TSO for Mode S was made available for public comment. All issues generated by public comment were resolved and TSO-C112 was issued February 5, 1986.

2. *Amend the FAR.* The following changes to the FAR are adopted by this amendment:

FAR Part 43, Appendix F. ATC transponder test and inspection requirements apply to both ATCRBS and Mode S transponders. Test areas include radio reply frequencies, suppression, receiver sensitivity, radio frequency, and output power. Those tests applicable only to Mode S transponders include Mode S diversity transmission channel isolation, Mode S address, Mode S formats, Mode S all-call interrogations, ATCRBS-only all-call interrogations, and squitter. The reference to Section 91.177 is corrected to refer to Section 91.172. The existing requirement for recordkeeping will be retained.

FAR Part 91, Section 91.24(a). For operations not conducted under Parts 121, 127, or 135, ATC transponder equipment installed (or in fleet operations, equipment introduced into the fleet inventory) within specific time periods must meet the performance and environmental requirements of the TSO's specified in the rule. The requirement to meet the Mode S TSO after January 1, 1992, does not apply to—

(a) A transponder which met the requirements of the rule when originally installed, and which is removed from an aircraft for maintenance and then reinstalled on the aircraft from which it was removed.

(b) A transponder which meets the requirements of TSO C74b or TSO C74c and is temporarily installed on an aircraft when the permanent transponder is removed for maintenance.

(c) A transponder which met the requirements of the rule when originally installed in a fleet aircraft, which is removed from the aircraft for maintenance /repair, and which is then installed on either the aircraft from which it was removed or on another aircraft in the same fleet.

Section 91.24(b). All aircraft operated in the airspace areas below are required to have either a combination ATCRBS or a Mode S transponder and automatic pressure altitude reporting equipment. The new requirement applies as follows:

1. in Group I TCA's;
2. in Group II TCA's; and
3. in all controlled airspace of the 48 contiguous States and the District of Columbia, above 12,500 feet MSL, excluding the airspace at and below 2,500 feet AGL.

Automatic pressure altitude reporting (Mode C) equipment is required in Group II TCA's.

Exceptions to the rule are as follows:

1. Operations of helicopters in TCA's at or below 1,000 feet AGL under a letter of agreement.
2. Operations of gliders above 12,500 feet MSL but below the floor of positive control area.

No Group III TCA's exist or are planned.

An editorial change has been made to substitute the word "operating" for the word "operable" in Section 91.24(b). Substitution of the word "operating" for the word "operable" is made to reflect the requirement that transponders must be turned on.

Section 91.90(b)(2)(iii). Aircraft operating in Group II TCA's are required to be equipped with automatic pressure altitude reporting equipment effective December 1, 1987.

The following FAR sections are amended to make transponder requirements under those sections consistent with the amended transponder installation requirements of Part 91:

1. FAR Part 121, Section 121.345(c);
2. FAR Part 127, Section 127.123(b); and
3. FAR Part 135, Section 135.143(c).

ADOPTION OF THE AMENDMENTS

For the reasons set forth above, Parts 43, 91, 121, 127, and 135 of the Federal Aviation Regulations (14 CFR Parts 43, 91, 121, 127 and 135) are amended, effective April 6, 1987.

The authority citation for Part 43 is revised to read as follows:

Authority: 49 U.S.C. 1354, 1421 through 1430; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983).

Amendment 43-27

Prelight Assembly of Gliders and Balloons

Adopted: April 28, 1987 **Effective: June 5, 1987**

(Published in 52 FR 17276, May 6, 1987)

SUMMARY: The purpose of these amendments is to discontinue classifying glider and balloon assembly as preventive maintenance, except in certain circumstances; add training requirements for pilots in preflight assembly of gliders and balloons; and add preflight assembly and post assembly inspections to the preflight responsibilities for glider and balloon pilots. The amendments are needed to ensure the continued assignment of responsibilities for preflight assembly and inspection of gliders and balloons while simultaneously reducing the recording burden on the public.

FOR FURTHER INFORMATION CONTACT: Mr. George Johnson, Project Development Branch (AFS-360), Office of Flight Standards, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, 20591; Telephone (202) 267-3798.

SUPPLEMENTARY INFORMATION:

Background

Part 43, Appendix A, paragraph (c), classifies the installation of certain glider wings as preventive maintenance. Paragraph (c) was amended (Amendment No. 43-23; 47 FR 41076; September 16, 1982) to add preflight assembly of balloons to the list of preventive maintenance.

Prior to amendment, balloon assembly classification was in dispute. Some persons considered it maintenance while others viewed it as an operational function. Classification as preventive maintenance in Amendment No. 43-12 (34 FR 14423; September 16, 1969) was intended to unify these viewpoints, utilizing the concept used successfully with gliders for many years. Public comment invited prior to amendment brought only favorable comment.

Amendment No. 43-23 simultaneously amended § 43.9 to require the performance and approval for return to service of preventive maintenance to be recorded in the aircraft records. Shortly after the amendment became effective, the FAA received the first of what became numerous complaints about the new recordkeeping requirements from glider and balloon operators and their associations. In response, the FAA agreed to review the matter.

A review of the situation revealed that, while § 43.9, as amended, requires preventive maintenance to be recorded, § 91.173(b)(1) requires the record to be retained only until the work is repeated or superseded by other work or for 1 year after the work is performed (i.e., until the glider or balloon is reassembled for the next flight). The requirements of § § 43.9 and 91.173(b)(1) are burdensome for gliders and balloons because they are disassembled and assembled so frequently.

The pilot in command is, by virtue of § 91.29, responsible for proper assembly of the glider or balloon, whether or not the assembly operation is recorded. Further, the pilot in command has typically performed the assembly and disassembly of gliders and balloons without recording the work for many years. FAA records of accidents and incidents do not indicate that improper assembly has played a significant role in glider or balloon accidents. Therefore, the FAA has decided to classify the installation of glider wings and tail surfaces, specifically designed for quick disassembly and assembly; the installation of balloon baskets and burners, specifically designed for quick removal; and the assembly of gliders and balloons as operational functions. To ensure that pilots recognize their responsiblities and are competent to perform the assembly and preflight inspection properly, Part 61 of the FAR is amended to reference gliders and balloons in the flight proficiency requirements of § § 61.107 and 61.127.

The type certificate data of some balloons permit multiple models of balloon baskets to be used on some envelopes. The interchange of these components is as simple to perform as a normal preflight assembly. The additional step of determining the eligibility for interchange is similar to the pilot-in-command process of determining that an aircraft is properly equipped for the flight being conducted. The FAA has determined, however, that when component interchange is involved, preflight assembly will continue to be classified as preventive maintenance. The recording requirements associated with preventive maintenance are necessary to provide record continuity for interchanged components so that compliance with required inspections, airworthiness directives, etc. can be determined.

On June 6, 1986, the FAA issued Notice of Proposed Rulemaking No. 86-8 (51 FR 21722; June 13, 1986). The notice proposed to amend the regulations to discontinue classifying glider and balloon assembly as preventive maintenance, add training requirements for pilots in preflight assembly of gliders and balloons, and add preflight assembly and post-assembly inspections to the preflight responsibilities for glider and balloon pilots.

DISCUSSION OF COMMENTS

Over 150 individual public comments were submitted in response to Notice 86-8. While the great majority of the comments are in agreement with the proposal, three commenters suggest changes that are beyond the scope of this rulemaking. Three commenters suggest that the rule be expanded to include assembly/disassembly of additional balloon components. While this recommendation merits further agency examination for possible future rulemaking, it is considered outside the scope of Notice 86-6 and thus is not adopted herein.

One commenter questions the FAA's use of the word "mooring" in proposed § § 61.107(f)(1) and 61.127(f)(1)). The commenter suggests the use of the word "tethering." The FAA agrees with the comment, and the amendment has been changed accordingly.

PAPERWORK REDUCTION ACT

Information collection requirements in this legislation (§ 43.9) have been approved by the Office of Management and Budget under this provisions of the Paperwork Reduction Act of 1980 (Pub. L. 95-511) and have been assigned OMB Control Number 2120-0020.

REGULATORY EVALUATION

The FAA is amending Parts 43 and 61 to discontinue classifying glider and balloon assembly as preventive maintenance, except in certain circumstances; add training requirments for pilots in preflight assembly of gliders and balloons; and add preflight assembly and post assembly inspections to the preflight responsibilities for glider and balloon pilots. The editorial revisions to Part 91 are intended to make the amendments to Parts 43 and 61 consistent with the maintenance record requirements of Part 91.

The primary objective of the final rule is to ensure the continued assignment of responsibilities for preflight assembly and post assembly inspection of gliders and balloons and at the same time reduce the recordkeeping burden on the public.

The principal area of interest in the rule is the change affecting the installation of glider wings and tail surfaces, specifically designed for quick disassembly and assembly by pilots, and the installation of balloon baskets and burners, specifically designed for quick removal by the pilot. The deletion of these requirements from the list of items classified as preventive maintenance would relieve glider and balloon operators from the burden of complying with the recording requirements of § 43.9 for the preflight assembly of gliders and balloons. FAA records of accidents and incidents indicate that improper assembly has not played a significant role in glider or balloon accidents. In this context, these amendments would not derogate safety and would not impose costs. The FAA, therefore, finds that these amendments would involve only unquantifiable benefits since glider and balloon operators would no longer be required to make the maintenance record entries specified by § 43.9.

The FAA has determined that this regulation will not affect international trade, nor is it expected to have a significant economic impact on a substantial number of small entities since there are no costs associated with these amendments.

CONCLUSION: This document relieves a substantial segment of the aviation community of a cost burden and does not impose any additional burden on any person. Therefore, the Federal Aviation Administration has determined that this document involves a regulation which is not a major rule under Executive Order 12291 or a significant regulation under the DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). A copy of the final evaluation prepared for this action is contained in the regulatory docket. A copy of it may be obtained by contacting the person identified under the caption "FOR FURTHER INFORMATION CONTACT." For the reasons stated earlier, it has been detemined further that the amendment will not have a significant economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

ADOPTION OF THE AMENDMENT

Accordingly, Parts 43,61, 91 of the Federal Aviation Regulations (14 CFR Parts 43, 61, 91) are amended as follows:

The authority citation for Part 43 continues to read as follows:

Authority: 49 U.S.C. 1354, 1421 through 1430; 49 U.S.C. 106(g) (Revised, Pub. L. 97–449, January 12, 1983).

Amendment 43-28

Foreign Air Carriers and Operators of Certain Large U.S.-Registered Airplanes

Adopted: May 19, 1987 **Effective: August 25, 1987**

(Published in 52 FR 20026, May 28, 1987)

SUMMARY: These amendments require that U.S.-registered aircraft leased by foreign persons be maintained in accordance with acceptable maintenance standards and clarify certain rules to preclude the commingling of noncommon (private) and common-carriage operations. These amendments are necessary to upgrade certain regulations regarding the leasing of U.S.-registered aircraft by foreign persons and to clarify the inspection and maintenance requirements applicable to foreign persons conducting private and common-carriage operations with U.S.-registered airplanes.

FOR FURTHER INFORMATION CONTACT: Messrs. David L. Catey, Manager, Project Development Branch (AFS-240), Air Transportstion Division, telephone (202) 267-3747, or Bob Baker, Manager, Project Developmnt Branch (AFS-360), Aircraft Maintenance Division, telephone (202) 267-3788, Office of Flight Standards, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591.

SUPPLEMENTARY INFORMATION:

Background

On October 9, 1980, Part 125 of the Federal Aviation Regulations (FAR) was published in the *Federal Register* (45 FR 67214). With certain exceptions, not germane to the current discussion, Part 125 up to now has applied to the operation of all U.S.-registered airplanes having a passenger seating configuration of 20 or more, or a maximum payload capacity of 6,000 pounds or more, unless they are required to be operated under the rules of Part 121, 135, or 137 of the regulations.

Although Part 125 was not intended to provide acceptable safety levels for common-carriage operations, the inspection programs and maintenance requirements of § 125.247 currently apply to U.S.-registered airplanes operated outside the United States by foreign persons. This results because Part 125 governs operation of a U.S.-registered airplane of the prescribed size unless that operation is required to be conducted under the rules of Parts 121, 135, or 137. Accordingly, up to now there has been no exclusion from Part 125 for operators under Part 129—Operations of Foreign Air Carriers.

At the time Part 125 was published, the FAA was considering rulemaking to revise Part 129 to cover inspection and maintenance requirements for U.S.-registered aircraft. Requiring foreign air carriers to comply with Part 125 immediately was deemed inappropriate in light of the possibility of change to Part 129. Consequently, in adopting Part 125, the agency established a deferred compliance date of January 1, 1983, for foreign air carriers. By Amendments 125-4 (47 FR 44718; October 12, 1982), 125-5 (49 FR 34815; Sepember 4, 1984), 125-6 (51 FR 873; January 8, 1986), and 125-7 (52 FR 6956; March 6, 1987), the agency extended the January 1, 1983, compliance date to September 1, 1984, February 28, 1986, February 28, 1987, and February 29, 1988, respectively, to provide sufficient time for completion of this rulemaking.

Subsequent to the adoption of Part 125, the agency has carefully monitored the operating experience of large U.S.-registered airplanes operated under Part 125. The operating experience can be divided into two main areas of interest. First, the frequency with which foreign air carriers operate U.S.-registered airplanes under lease has shown a marked increase. These lease agreements are desirable since they provide a means for U.S. air carriers to arrange for use of these airplanes during periods of reduced traffic levels. The second area concerns the distinction between common carriage and noncommon carriage operations.

Most foreign air carriers and foreign persons engaged in common-carriage operations have aircraft maintenance program requirements adopted by their domestic governments which are consistent with the international standards in Part I of Annex 6 to the Convention on International Civil Aviation Organization (ICAO). ICAO, Annex 6, requires each operator to comply with the terms of the aircraft's certificate of airworthiness and to maintain the aircraft in an airworthy condition. To meet these requirements, each foreign operator of a U.S.-registered aircraft used in common carriage must ensure that the aircraft is maintained by a qualified organization with a well-trained staff and adequate

workshops, equipment, and facilities. That organization must also have appropriate maintenance manuals, records, and procedures regarding training, inspection, and release of the aircraft. However, some countries may not have requirements completely consistent with the ICAO aircraft maintenance program requirements. This means that U.S.-registered airplanes operated by foreign air carriers or persons from those countries might not meet those international standards. To allow operation of these aircraft would be inconsistent with U.S. international obligations for aircraft of its registry. These amendments will therefore require compliance with the United States' international airworthiness obligations.

Concerning the second main aspect of the operating experience of large U.S.-registered airplanes of the size covered by Part 125, that part was designed to provide a regulatory scheme for an appropriate level of safety for airplanes not used in common carriage. This regulatory intent is stated explicitly in § 125.11. That section prohibits common carriage by a Part 125 certificate holder and declares that any person holding an air carrier operating certificate is ineligible for a certificate under Part 125. The sole exception to the principle that Part 125 is intended to apply only to noncommon carriage to date has been the case of a foreign person common carrier compelled to operate under the rules of Part 125 by operating a U.S.-registered airplane of the size covered by that part. These amendments eliminate that exception by expanding Part 129 to apply to each foreign operator of a U.S.-registered aircraft engaged in common carriage operating either into and out of or wholly outside the United States.

On December 10, 1985, the FAA published Notice No. 85-24 (50 FR 50588, December 10, 1985) to resolve the issues discussed above. The public comment Period closed on April 10, 1986.

Analysis of Comments

Seven public commenters responded to Notice No. 85-24. Two commenters supported the proposals to preclude the commingling of noncommon (private) and common-carrer operations. No comments were received with respect to the operational as opposed to the airworthiness and maintenance proposals of Notice No. 85-24. Thus, to preclude the commingling of noncommon (private) and common-carriage operations, new §§ 121.3(i), 125.11(c), 129.1(b), 129.11(a)(4) and (c), 135.11(c), and a new paragraph 5 of Section V. A., of paragraph (b) of Appendix A of Part 129 are adopted as proposed. Also, the proposals to revise §§ 125.1(a) and (b)(1), (3), and (4), 129.1(a) and 129.11(a) are adopted as proposed.

Section 125.1(d) is removed because the cutoff date of January 1, 1983, is obsolete, and the reference to paragraph (d) is also removed from § 125.1(a).

Proposed § 125.11(a) is revised by replacing the words "is authorized to operate aircraft under an operating certificate or operations specifications" with the words "holds the appropriate operating certificate and/or operations specifications necessary to conduct operations." This revision is consistent with terminology used in SFAR 38-2. Proposed § 125.11(a) is adopted with this modification.

Several commenters recommend that proposed § 129.14(b) be revised to require a maintenance program that would be equivalent to the continuous maintenance program required for Part 121 air carriers. It was suggested that a more specific reference is needed to address the significant maintenance aspects of Part 121 which would clearly exclude an obligation for the foreign air carrier to follow other certification requirements of Part 121 or 135. To the same general effect is the suggestion of another commenter who proposes a change to language in proposed § 129.14(b) to require that the program selected meet the requirements consistent with § 121.367 or 135.425 as appropriate. The FAA does not agree with these suggestions. A primary objective of the amendment is to require that a U.S.-registered aircraft leased by a foreign person be maintained in accordance with maintenance standards that are consistent with the requirement of the country which is a member of the International Civil Aviation Organiztion. The FAA considers it would be inappropriate to specify all the applicable FAR sections or to limit an operator's maintenance program requirements to those two sections because an acceptable maintenance program must be in compliance with numerous other sections of Parts 121 and 135, as appropriate.

Another commenter questions who would be responsible for airworthiness control when a foreign operator under Part 129 operates a U.S-registered aircraft. Proposed § 129.14(a) and (b) would require each foreign person who operates a U.S.-registered aircraft in common carriage to meet prescribed maintenance requirements. Aircraft maintenance programs which are consistent with the international standards in Part I of ICAO Annex 6 require each operator to comply with the terms of the aircraft's

certificate of airworthiness and to maintain the aircraft in an airworthy condition. The Federal Aviation Regulations prescribe airworthiness standards for all U.S.-registered aircraft operating within or outside the United States, irrespective of the person operating the aircraft. This includes U.S.-registered aircraft operated by a foreign air carrier or foreign person.

The FAA has further reviewed the maintenance requirements proposed in § 129.14(b) and the comments received concerning the proposed wording of that paragraph. As written, the proposal creates a misunderstanding as to what would constitute an acceptable maintenance program as required by proposed 129.14(a). In addition, proposed § 129.14(b) would have provided that U.S.-registered aircraft operated by foreign persons would be adequatley maintained in accordance with either Part 121 or Part 135, without regard to or consideration of the maintenance standards that are consistent with the requirement of the country which is a member of the ICAO. Further, specific requirements of a maintenance program would best be identified in an Advisory Circular which could address specific requirements for a particular type of operation. Based on the foregoing, § 129.14 has been revised to impose a general requirement that U.S.-registered aircraft operated in common carriage by any foreign air carrier or any foreign person be maintained in accordance with a maintenance program which has been approved by the FAA Administrator. The specific requirements of the program will be addressed in an Advisory Circular that will provide guidance as to what would constitute an approved maintenance program. The Advisory Circular will be disseminated to FAA International Field Offices and Flight Standards District Offices.

Two commenters recommend that the maintenance rules of Part 43 be revised to include reference to Part 129. The FAA agrees and has adopted this recommendation by amending § 43.13(c).

Regulatory Evaluation

These amendments clarify the maintenance and minimum equipment list requirements applicable to U.S.-registered aircraft operated by foreign persons. Section 129.11 (a)(4) will impose only a minimal cost by requiring that the registration markings of each U.S.-registered aircraft be listed on the foreign carrier's part 129 operations specifications.

Two commenters support the proposed sections that would preclude the comingling of noncommon (private) and common-carriage operations, and no opposing comments were received. A minimal cost may result from the adoption of these amendments. A remote possibility exists that one or several transport category aircraft may be currently listed on both a Part 125 (private-carriage) operations specifications and either a Part 121, Part 129 or Part 135 (common carriage) operations specifications. Although such simultaneous listing of an aircraft on both private- and common-carriage operations specifications is contrary to current FAA administrative practices, a minimal cost may be incurred by the FAA and a few aircraft operators to delist an aircraft from either the private-carriage operations specifications or the common-carriage operations specifications. In addition, the few operators who may be using the same aircraft in private- and common-carriage operations under a simultaneous listing may lose some utilization of their aircraft as a result of this rule. Any costs that would be incurred are expected to be very minor, however, because of the very limited extent of this practice.

New § 129.14(b) provides for the use of a minimum equipment list by a foreign air carrier or foreign person using any U.S.-registered aircraft in common-carriage operations. The provisions of § 129.14(b) are more explicit and appropriate to common-carriage operations than the minimum equipment list requirements provided in § 91.30, which were reinstated effective March 13, 1986 (50 FR 51188, December 13, 1985), in Amendment 91-192. Both Amendment 91-192 and these amendments preclude the necessity for exemptions, thereby reducing the administrative burden of both foreign air carriers and the FAA.

Conclusion

These amendments will facilitate the agency's maintaining distinctions among Parts 91, 121, 125, 129, and 135 of the regulations so that all U.S.-registered aircraft meet appropriate standards applicable to the type of operations (air transportation versus other air commerce) being conducted. They also provide for minimum equipment list use by foreign air carriers and other foreign persons using any U.S.-registered aircraft in common carriage operations without the necessity of obtaining an exemption. These amendments will have either no impact or a small positive impact on trade opportunities of U.S. and foreign persons who may wish to enter into aircraft lease agreements. Accordingly, for these reasons

and those discussed under the heading entitled "Regulatory Evaluation," the FAA has determined that these amendments are not considered to be significant under DOT Regulatory Policies and Procedures (44 CFR Part 11034; February 26, 1979) and are not major as defined in Executive Order 12291. For these reasons and becasuse these amendments will result in negligible costs, I certify that, under the criteria of the Regulatory Flexibility Act, the amendments will not have a significant economic impact on a substantial number of small entities. The overall economic impact of this rulemaking is so minimal that it does not require a full regulatory evaluation. In addition, benefits to this agency and some foreign operators are expected to secrue from the elimination of the need for certain exemptions.

Adoption of the Amendments

In consideration of the foregoing, Parts 43, 91, 121, 125, 129, and 135 of the FAR (14 CFR Parts 91, 121, 125, 129, and 135) are amended effective August 25, 1987.

The authority citation for Part 43 continues to read as follows: *Authority:* 49 U.S.C. 1354, 1421 through 1430; 49 U.S.C. 106(g) (Revised, Pub. L. 97-449, January 12, 1983).

Amendment 43-29

Aircraft Indentification and Retention of Fuel System Modification Records

Adopted: September 1, 1987 **Effective: December 8, 1987**

(Published in 52 FR 34096, September 9, 1987)

SUMMARY: This final rule amends the Federal Aviation Regulations to require: (1) that 12-inch high nationality and registration marks be displayed on all aircraft that penetrate an Air Defense Identification Zone or a Defense Early Warning Identification Zone; (2) that a civil aircraft identification data plate be displayed on the exterior surface of each U.S.-registered aircraft; and (3) that a copy of the form which authorizes the alteration of an aircraft with fuel tanks within the passenger or a baggage compartment be kept on board the modified aircraft.

These amendments are necessary because of the increased dangers to civil aviation resulting from the major increase in illegal drug importations into the United States by air. They are intended to expand the effectiveness of narcotic interdiction and, thereby, provide for improvement in safety of civil aviation operations, while at the same time reducing the flow of drugs by air into the United States.

FOR FURTHER INFORMATION CONTACT: Joseph J. Gwiazdowski, Aircraft Manufacturing Division (AWS-200), Office of Airworthiness, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C., 20591, telephone (202) 267-9541.

SUPPLEMENTARY INFORMATION:

Background

Although the Federal Aviation Administration (FAA) does not enforce the anti-drug smuggling and related criminal statutes, it is concerned with the hazards to air commerce in the United States arising from the use of aircraft to escape detection while importing illegal, contraband substances (narcotic drugs, marijuana, and depressant or stimulant drugs) into the United States. The hazards to air commerce have increased consistent with the growing number of pilots who are willing to risk the carriage of these illegal goods despite escalating law enforcement activities. The U.S. Customs Service (Customs) reports that the vast majority of illegal drug trafficking by air into the United States passes through an Air Defense Identification Zone (ADIZ) or Defense Early Warning Identification Zone (DEWIZ). The means for detection of these aircraft include low altitude radar, law enforcement pursuit aircraft, and advanced police techniques. Those pilots committed to evading detection by pursuit aircraft may engage in extremely dangerous flight techniques, such as very low flight to avoid radar; landing and taking off from unprepared landing areas; operation without lights; and operation in weather conditions beyond the capability and/or qualifications of the aircraft or pilot. These flight techniques create a safety hazard for all other aircraft in the area and for persons and property on the ground. Additionally, many of the aircraft used for such operations have been equipped with extended-range fuel tanks which are not installed in accordance with the Federal Aviation Regulations (FAR), posing an additional safety hazard. Thus, while other agencies are responsible for criminal law enforcement concerning illegal substances (narcotic drugs, marijuana, and depressant or stimulant drugs), the hazardous aeronautical activities of pilots engaged in smuggling and the potential increase in volume of these substances into the United States pose a direct threat to air commerce. This threat was a basis for the FAA adopting § 91.12 of the FAR, which provides that no person may operate a civil aircraft within the United States with knowledge that narcotic drugs, marijuana, and depressant or stimulant drugs are carried in the aircraft, unless authorized under Federal or State law. During several meetings, the FAA and Customs representatives focused on actions required to develop more effective means to reconcile specific drug enforcement problems involving aircraft. In a July 11, 1985, letter to the FAA, the Assistant Secretary of the Department of Treasury outlined and proposed the specific regulatory amendments which Customs considered to be necessary to assist it in curbing use of aircraft carrying illegal substances and to identify those aircraft which may be used for drug smuggling. Customs believes that their proposed amendments represent a significant step toward curbing the use of aircraft for drug smuggling. The proposed amendments are based on the increase in illegal drug importation by aircraft and on the value to law enforcement officials of positive identification of all aircraft including those aircraft which may be involved in such activities. The problems identified by Customs include:

1. Positive air-to-air identification of aircraft penetrating an ADIZ or DEWIZ is hindered by the difficult-to-read 3-inch identification marks displayed on some of these aircraft;

2. Aircraft with identification (I.D.) plates which cannot readily be seen hamper the prompt identification of stolen or falsely numbered aircraft; and

3. Inability to readily verify unapproved aircraft modifications involving unauthorized fuel tanks in the passenger compartment or a baggage compartment because the records for approved aircraft modifications are not required to be kept aboard the aircraft.

On July 3, 1986, the FAA issued Notice of Proposed Rulemaking (NPRM) No. 86-9 (51 FR 25174; July 10, 1986) proposing responses to these three problems raised by Customs.

Registration Numbers

As discussed in the notice, Customs and other law enforcement groups, in combating drug trafficking by air, frequently must attempt to identify, from a high-performance aircraft, a small low-performance aircraft including aircraft suspected of being used in the illegal activity. Often these operations must be performed at night using special devices and capabilities to enhance identification and to apprehend smugglers. Many of the suspected aircraft have small, 3-inch nationality and registration marks (N-numbers) which are difficult to see or detect when attempting air-to-air identification. This requires maneuvering relatively close to these aircraft so that positive identification can be made. The use of larger registration marks makes identification easier and results in safer operation by maintaining a larger (up to six times greater) separation between the aircraft.

Customs has found that many aircraft flying into the United States display the small, 3-inch marks, making it difficult to identify aircraft, including suspect aircraft. The vast majority of the suspected aircraft, which are not limited to a particular type of aircraft, pass through an ADIZ or DEWIZ prior to entering the United States. It is these aircraft for which Customs, or other law enforcement or military organizations, are likely to attempt air-to-air identification.

Identification Plates

The FAA has adopted several related amendments concerning I.D. plates based on the needs and comments of the aviation community. Section 45.11 of the FAR was changed by Amendment 45-3 (52 FR 187; January 10, 1967) to require the I.D. plate to be in an accessible location "near an entrance," not necessarily an *external* location, to allow for maximum I.D. plate protection and to facilitate normal aircraft inspection. Based on information presented by small aircraft manufacturers, the FAA again changed § 45.11 of the FAR by adopting Amendment 45-7 (33 FR 14402; September 25, 1968) to provide an optional location for an aircraft I.D. plate. Under this option, the I.D. plate may be affixed permanently on the exterior of the fuselage near the tail surfaces, if it is legible to an observer on the ground. Additionally, FAA Advisory Circular AC 45-2, Identification and Registration Markings, which provides guidance and information concerning the identification and marking requirements for aircraft, includes a provision that, if under certain conditions the I.D. plate had to be covered or enclosed in any manner, its accessibility is considered acceptable if it can be revealed without the use of tools.

The Customs Service indicates that when investigating aircraft, including those suspected of being used for smuggling, it is difficult to determine quickly whether the FAA assigned N-number is displayed appropriately on the aircraft. Furthermore, false numbers may be used on stolen aircraft, which frequently are used for smuggling. Cross-checking the N-number with the I.D. plate data, which is an integral part of identification for the aircraft, assists in determining whether the N-number is false. The I.D. plates for many aircraft, however, are located in the aircraft interior so that they cannot be read from outside the aircraft, making it difficult for investigators to make an on-the-spot check of a suspected aircraft. Customs contends that the repositioning of existing I.D. plates, or placement of another I.D. plate on the exterior of the aircraft near the main entrance, would enable investigators to compare quickly the serial number with the N-number to help determine whether suspect aircraft have been stolen or the N-numbers falsified.

Additional Fuel Tank Installation

The FARs prescribe requirements for the approval of major alterations to aircraft type designs, which include such installations as additional fuel tanks in an aircraft. The FARs also prescribe recordkeeping requirements for such approvals. Most fuel tank installations performed on aircraft operating under Part 91 require an appropriate approval for the type design change and recording of the completion of the modification on FAA Form 337. Those aircraft operated under Part 121, 127,

and 135 of the FARs may have additional fuel tanks installed in accordance with applicable requirements, of the particular continuous airworthiness program and prepare the documentation for the alteration other than an FAA Form 337, in accordance with the continuous airworthiness program.

Customs reports that aircraft used to smuggle drugs are often modified with fuel tanks which are installed in the passenger or a baggage compartment and which are not authorized by the FAA. These fuel tanks are installed to permit the aircraft to make long unrefueled flights, such as from the United States to South America. This long-range unrefueled capability adds to the difficulty in pursuing suspected aircraft. These unauthorized, usually haphazard, fuel tank installations create a safety hazard because there is no assurance that they meet the safety standards established by the FAA.

One problem with attempting to identify the unauthorized extended-range fuel tank installations is that it is difficult to check, on the spot, whether the tanks have been installed in accordance with FAA requirements. The FAR type certification procedures require FAA approval for any changes to type design of a U.S. civil aircraft, such as modifications to install extended range fuel tanks. Documentation evidencing such approval may vary depending upon the nature of the change to the aircraft's type design.

One way that approval can be evidenced is for an authorized person performing in the work to execute an FAA Form 337 in accordance with Appendix B of Part 43 of the FAR. However, there is currently no requirement for records of such authorization to be on board the aircraft. Customs contends that a regulation requiring an FAA Form 337 to be aboard the aircraft when extended-range fuel tanks are installed within the passenger or a baggage compartment would assist Customs in concentrating interdiction efforts on suspicious aircraft not authorized to have such installations. Customs investigators can make an on-the-spot check of the suspected aircraft's FAA Form 337. In addition, this action would assist the FAA in identifying aircraft with unauthorized fuel tanks, and thus avoid a potential hazard to the aviation community and the public.

Participation in Rulemaking

Notice No. 86-9 gave interested persons an opportunity to participate in amending these rules. Due consideration was given to all information submitted by the commenters. Except as discussed in this preamble, the revisions adopted by these amendments and the reasons for them are the same as those in Notice No. 86-9.

Discussion of Amendments

The FAA has determined that the amendments proposed in Notice No. 86-9 should be adopted. The comments received in response to the notice are discussed below.

A. Improve Identification of Aircraft Penetrating the ADIZ and DEWIZ

§§ 45.21 and 45.29

This amendment requires that all aircraft penetrating the ADIZ or DEWIZ display 12-inch markings. However, if any surface authorized to be marked is not large enough for full-size marks, marks as large as practicable shall be placed on the largest of the authorized surfaces in accordance with § 45.29(f).

To ease the burden on owners of affected aircraft which penetrate the defense zones, under the provision of § 45.21(d), this amendment permits the 12-inch markings to be temporary on those "grandfathered" aircraft and certain aircraft which are currently authorized to operate with small markings as specified in § 45.29(b). Moreover, to avoid any burdan due to downtime, ferrying, or loss of revenue associated with marking the affected aircraft, a 90-day period is allowed for compliance.

Adoption of this amendment provides for the improvement in safety associated with air-to-air identification of *all aircraft* which penetrate the ADIZ or DEWIZ. It has no impact on the majority of other aircraft operators since most aircraft currently displaying marks less than 12 inches high under Part 45 do not penetrate these zones and thus pose no problem at this time. Those aircraft with smaller marks operating solely within one of these zones, e.g., the Alaska DEWIZ or ADIZ, also will not be affected if they do not depart and reenter (penetrate) the zone.

B. Change I.D. Plate Location

§ 45.11

This amendment requires that all aircraft display an I.D. plate, as specified by § 45.11(a), on the aircraft fuselage exterior surface, in a location legible to an observer on the ground. It must be located

adjacent to and aft of the rear-most entrance door or on the exterior surface near the tail. An aircraft I.D. plate affixed in an easily accessible area, legible to an observer on the ground, facilitates verification of aircraft identification by FAA inspectors, Customs investigators, and other law enforcement officials. The amendment provides for ready access to the I.D. plate data without having to enter the aircraft. It makes the I.D. plate information and N-number available simultaneously to provide a cross reference to help determine whether the aircraft may have been stolen or to determine if the registration number has been falsified. It also facilitates FAA inspectors' identification of aircraft for verification of maintenance, modification, and other airworthiness requirements to assure safe aircraft operation.

This amendment is not retroactive since this could result in a major change which would pose an undue burden on many aircraft owners. For example, if the I.D. plates currently affixed to aircraft, as required, were to be removed (i.e., repositioned) from the existing locations, this could result in damage to the aircraft and I.D. plate, and might require burdensome engineering and manufacturing changes such as structural, interior or exterior repair, or repainting.

As a cost-saving alternative for aircraft manufactured prior to 90 days after the effective date of this amendment, this final rule allows the display of just the model designation and builder's serial number on the fuselage exterior, adjacent to and aft of the rear-most entrance. This may be done if the identification plate is secured at an accessible exterior or interior location near an entrance. The model designation and serial number are required to be affixed in such a manner that they are not likely to be defaced or removed during normal service. Unlike the required fireproof I.D. plate, this "supplemental" identification does not have to be affixed in a manner such that it is not likely to be lost or destroyed in an accident. Thus, the data may be affixed in a relatively low-cost manner, such as by painting or decal.

C. Illegal Fuel Tank Installation

Part 43. Appendix B(a) and (d); § 91.27(c); and § 91.173(a) and (d)

This amendment requires that all affected aircraft modified with additional fuel tanks in the passenger or a baggage compartment, under Part 43 of the FAR, physically have on board the aircraft a copy of the required FAA Form 337. This includes aircraft previously not required to have an FAA Form 337 for fuel tank installations when operating with a special flight permit for the purpose of delivery or export. This amendment also requires that the owner or operator of an aircraft with such fuel tanks present the FAA Form 337 for inspection by any law enforcement officer.

This amendment provides one means for FAA, Customs, and other investigators to quickly obtain evidence as to whether the additional tanks in the aircraft are authorized or possibly illegally installed. Enforcement action can then be taken by the FAA and the appropriate agency against persons operating such aircraft. Action can also be taken to prevent the aircraft from being flown. This rule makes it possible for Customs to concentrate interdiction efforts on those aircraft modified with unauthorized fuel tank installations and which are possibly being used for illegal drug trafficking. By limiting this rule to aircraft modified with fuel tanks in the passenger or baggage compartments, which requires an FAA Form 337 under Part 43, operators of aircraft with FAA-approved extended-range fuel tanks located elsewhere in the aircraft (e.g., wing tip tanks) would not be required to keep that authorization on board the aircraft.

DISCUSSION OF COMMENTS:

General

Eight commenters, representing the views of the aviation community, participated in this rulemaking. Comments were submitted by individual pilots and owners and operators of aircraft including representatives of some aviation and aircraft manufacturers associations. Generally, the commenters support Customs' objective to stop the flow of illegal drugs into the United States by air. However, most commenters disagree as to what amendments should be adopted and who should comply with them. Some commenters disagree with all the amendments or recommend proposals which are outside the scope of the NPRM. The majority of the commenters address the proposed amendments separately and give reasons which oppose a particular issue and either concur in or withhold comments on the other issues.

The comments from aviation association representatives on the amendments also range from full support as noted by the Airline Pilots Association (ALPA) to "no merit" as the Aircraft Owners

and Pilots Association (AOPA) contends. Many commenters contend that the FAA action will not stop drug trafficking and question the value of these amendments. They contend that there are more effective ways to stop drug smugglers such as direct legislation against smugglers. The commenters, however, fail to recognize or acknowledge that the FAA action proposed in Notice No. 86-9 is only a part of the total U.S. Government on-going effort to actively suppress drug smuggling, which includes law enforcement agencies efforts of other Departments such as the Treasury, Justice, and Defense. These initiatives carry out the mandates of Congress, such has the Anti-Drug Abuse Act (Pub.L. 99-570, October 27, 1986).

The pertinent comments and commenters' recommendations concerning each amendment are discussed in the following paragraphs. In addition, comments concerning the time and cost of compliance are discussed separately.

Registration Numbers

The majority of commenters object to the requirement for displaying 12-inch N-numbers on certain aircraft that penetrate an ADIZ or DEWIZ. The commenters contend that the amendment imposes unnecessary costs on owners and operators of aircraft allowed to display smaller N-numbers under § 45.29(b), with no benefit to legitimate operators who must pay for an ineffective law which drug smugglers can easily circumvent with temporary and false markings. Also, operators of some aircraft such as experimental amateur-built, rotorcraft, gliders, airships, and balloons feel that this amendment should be limited to twin-engine, fixed-wing aircraft.

The FAA disagrees because, as stated in the notice, there is an urgent need for positive identification of *all aircraft* that penetrate the defense zones, regardless of size and configuration. However, it should be noted that this amendment only affects those aircraft that display the ineffective small N-numbers and penetrate the ADIZ or DEWIZ. Additionally, to avoid unnecessary costs to operators of the affected aircraft, a 90-day time period is provided for compliance. This provides for sufficient time in which the temporary or permanent 12-inch N-numbers can be affixed to aircraft affected.

A few commenters questioned why all aircraft operating in Alaska must display 12-inch marks since Alaska lies entirely within an ADIZ while aircraft in the contiguous United States may display small N-numbers. However, the rule applies to those aircraft that *penetrate* the ADIZ or DEWIZ. Accordingly, aircraft allowed to display small N-numbers in accordance with regulations, whether in the United States or elsewhere, must affix 12-inch N-numbers only if they are going to penetrate an ADIZ or DEWIZ. Thus, aircraft operating solely within the State of Alaska will not be required to display 12 inch N-numbers unless they depart on and reenter the ADIZ.

Some commenters contend that the amendment penalizes legitimate aircraft operators while drug smugglers can easily circumvent or violate the regulation. The FAA disagrees because most aircraft operators are required to display 12-inch N-numbers under Part 45. Further, the FAA, in conjunction with other law enforcement agencies, aggressively investigates and takes appropriate action on incidents involving violations of the FAR. Furthermore, under the now Anti-Drug Abuse Act, increased civil and criminal penalties may be imposed on aircraft operators involved in drug smuggling. These penalties range up to $250,000 and 20 years in prison and include the seizure and forfeiture of the aircraft. The amendments to §§ 45.21 and 45.29 have been adopted as proposed.

Identification Data Plates

With regard to the exterior location of I.D. plates and/or data, most commenters contend generally that this amendment is ineffective, impractical, or redundant. A majority of the commenters contend that the amendments would be ineffective because the rule can be easily circumvented by falsifying the data on the exterior surface of the aircraft. The FAA does not agree since the FAA penalties and the more recent legislation, cited previously, are expected to deter such violations.

Some commenters maintain that the rule is impractical because repositioning the existing I.D. plates or affixing a second I.D. plate could damage the aircraft, especially those covered with fabric. The FAA does not agree since the rule does not require repositioning of the original I.D. plates, which conceivably could result in damage to the aircraft. Also, both old and new aircraft can have I.D. plates affixed on the exterior surface, as required, without damaging even fabric-covered aircraft.

Some commenters claim that I.D. plates affixed to the exterior surface of large aircraft would be too high to read by an observer on the ground. Others argue that there is no need to change the

I.D. plate location on some rotorcraft, open cockpit aircraft, and balloons where the required I.D. plate can be viewed by an observer outside the aircraft.

However, although I.D. plates can be viewed from the outside of some aircraft, the FAA has determined that I.D. plates in a *standard* location on the exterior surface adjacent to and aft of the rear-most entrance door of an aircraft provides for quick access to the I.D. information, in addition to precluding the need to gain access to the inside of an aircraft.

With regard to the redundant data, commenters contend that there is no need to affix the same data in two places on the same aircraft, therefore, the status quo should be maintained or the NPRM withdrawn.

The FAA disagrees because the I.D. information which is secured inside an aircraft cannot be obtained readily, as some contend, without gaining access to the aircraft. The FAA has determined that the standard exterior location is the most effective location for I.D. plates and/or data. A standard location provides quick access to the identification data with the least impact on the aviation community since most aircraft owners and operators already comply with that requirement, while others can mark their aircraft inexpensively as discussed in Notice No. 86-9.

Additional Fuel Tank Installations

The majority of commenters responding to this amendment agreed with the requirement to have the completed FAA Form 337 aboard an aircraft modified in accordance with Part 43 with fuel tanks in the passenger or baggage compartments. Those opposed contend that the amendment imposes an unnecessary burden on operators of aircraft that may be modified with fuel tanks in accordance with regulations which do not require the use of an FAA Form 337 for documenting major alterations. Accordingly, they maintain that the rule should exempt operators under Parts 121, 127, or 135, as applicable.

The FAA considered the regulations governing aircraft modified under other applicable provisions. However, approved documentation under a continuous airworthiness maintenance program may not be as suitable for carriage on an aircraft as the FAA Form 337. For that reason, the proposal amendment applied only to aircraft modified pursuant to Part 43 with fuel tanks installed in the passenger or baggage compartments. This amendment adopts that proposal. The new rule does not require documentation for aircraft modified under other provisions of the FAR.

Some commenters state that the FAA Form 337 can be easily falsified or that an approved installation could be used by a smuggler and that, either way, the amendment has little value. The FAA does not agree since violations of the applicable regulations, such as unapproved equipment installations, are vigorously pursued and enforced by the FAA to maintain safety in air operations. In addition, Customs considers this amendment to be a significant step toward curbing the use of aircraft for drug smuggling.

Time for Compliance

Some commenters object that the proposal does not provide sufficient time for compliance and that this creates an undue burden on owners and operators because of the requirements for ferrying and downtime. The FAA agrees with these commenters. It was planned to allow a period of 90 days after the effective date for compliance with the requirements for the display of 12-inch N-numbers and for the affixing of I.D. plate and/or data. In the NPRM, however, the "October 8, 1986" date was published in error apparently by using the published date of July 10, 1986, as the start of the 90-day period. A correction is made to allow sufficient time for compliance.

To preclude an undue burden on aircraft owners and operators, the 90-day period provides time for appropriate N-numbers and the I.D. plate and/or data to be affixed. The delayed compliance time only applies to the requirements for the display of 12-inch N-numbers and the I.D. plate and/or data. The display of temporary 12-inch markings is permitted for N-numbers, as appropriate, and the method for affixing data plate information on the exterior surface of an aircraft is purposely undefined to allow for economic alternatives, such as painting or decals.

Cost of Compliance

The majority of commenters object to the cost that would be imposed by the proposed 12-inch N-numbers and I.D. plate amendments. They contend that the cost of compliance estimates are too

low. In addition, the commenters indicate that the FAA cost estimates do not reflect a loss of revenue caused by ferrying and downtime.

The FAA disagrees with the commenters that its cost estimates are too low. The FAA believes its cost estimates to be a good indicator of what aircraft operators/owners impacted would, on the average, incur. Moreover, after careful examination of the comments received on NPRM No. 86-9, it has become apparent to the FAA that the majority of the commenters apparently failed to consider the FAA assumptions noted in the NPRM or as detailed in the draft regulatory evaluation in the docket. This evaluation fully explains how the cost of compliance estimates, which range between $100 and $215, were derived and contains a number of assumptions on which these cost estimates are based. Briefly, some of these assumptions are based on the fact that only those aircraft displaying small N-numbers under § 45.29, which includes aircraft "grandfathered" by Amendments 45-13 and 45-15, would be impacted by the 12-inch N-numbers requirement when penetrating the ADIZ or DEWIZ. It is further assumed that all operators of those "grandfathered" aircraft will be required to display 12-inch N-numbers only 1 or 2 years sooner than they otherwise would be required because of repainting, restoring, or changing the marks. Therefore, the FAA evaluation accurately reflects only that small portion of the estimated $550 cost of displaying 12-inch N-numbers. The net result is that this rule will impact very few aircraft since most aircraft would switch to permanent 12-inch N-numbers in that period.

The cost of compliance for the I.D. plate amendment assumes that this data information would be painted on the designated exterior of all existing impacted aircraft for about $100 based on conversations between FAA and fixed base operators.

With regard to downtime and ferrying, the FAA allows impacted aircraft operators and owners a period of 90 days after the effective date of the final rule to come into compliance. This period of 90 days provides sufficient time for impacted operators and owners to comply with the rule without incurring additional costs attributed to downtime and ferrying. The intent of the FAA has always been to allow a reasonable period of time for impacted parties to comply with the rule. It has always been the policy of the FAA not to impose undue cost burdens on parties impacted by its regulatory efforts.

Summary of Comments

Most commenters oppose the adoption of the amendments; however, they have neither provided sufficient justification for their positions nor shown that withdrawing Notice No. 86-9 is in the public interest. It appears that many commenters failed to consider the reasons for adopting the amendments provided in the NPRM. Many commenters objected that they must comply with the amendments when, in fact, they are not affected. For example, their aircraft will not penetrate an ADIZ or DEWIZ, or the I.D. plates are already affixed as required. The new requirement for the appropriate FAA Form 337 to be aboard aircraft modified with certain fuel tanks under Part 43 is favored by the majority of the commenters and poses no problem.

The FAA agrees with comments requesting that it clarify and correct errors. Therefore, the comments that the FAA is accepting, and which the final rule reflects, include an appropriate compliance date and editorial changes suggested to clarify the amendments as proposed. Also, in response to comments, the FAA has also reevaluated and clarified the cost impact where necessary.

REGULATORY EVALUATION SUMMARY:

The regulatory evaluation prepared for this rule examines the benefit and cost aspects of the establishment of identification, registration marking and recording of major repair requirements that impact general aviation aircraft. The rule includes amendments to Parts 43, 45, and 91 of the FAR, which respond to the Department or Treasury's request for the following:

1. That, 90 days after the effective date of this rule, 12-inch high nationality and registration marks (N-numbers) must be displayed on aircraft that penetrate an ADIZ or a DEWIZ;

2. That, 90 days after the effective date of this rule, a civil aircraft identification (I.D.) plate or its information must be displayed in a legible area on the fuselage exterior of an aircraft either adjacent to and aft of the rear-most entrance, or on the fuselage near the tail surfaces; and

3. That, after the effective date of this rule, a copy of the FAA Form 337 completed upon installation of fuel tanks installed within the passenger compartment or a baggage compartment under Part 43 of the FAR be kept in the aircraft by the owner or operator.

Costs

Estimates of the cost of compliance with the amendments to Parts 43, 45, and 91 have been developed by the FAA. Cost estimates were obtained primarily from civil aircraft manufacturers and fixed based operators.

This evaluation estimates that the one-time cost of compliance associated with the amendments to § 45.11 (I.D. plate amendment) and § 45.29 (12-inch N-number amendment) are expected to range between $7 million and $8 million (present discounted value of cost at 10 percent, 1987). The amendment to § 45.11 will impact an estimated 79,300 to 82,000 fixed-wing aircraft, rotorcraft, and other types of affected civil aircraft (blimps, balloons, and gliders) at a cost of $100 each. Moreover, the amendment to § 45.29 will affect an estimated 3,900 to 13,500 fixed-wing aircraft and rotorcraft at a cost of $55 to $115 each, respectively. Collectively, the cost of compliance will range between $100 and $215 per aircraft (1985 dollars). Conversely, the amendments to Appendix B of Part 43 (Recording of Major Repairs and Major Alterations), § 91.27 (Civil Aircraft: Certifications Required), and § 91 173 (Maintenance Records) are estimated to impose no additional cost. Under this amendment, this form is filled out in triplicate, rather than duplicate, to provide for a copy to be kept on board an aircraft modified with a fuel tank in the passenger compartment or a baggage compartment. In addition, the amendment to § 45.21 (General) is estimated to impose no additional cost to owners and operators of aircraft which may penetrate a defense zone because it merely provides for the option of using temporary or permanent 12-inch markings rather than an additional requirement.

Benefits

The anticipated benefits of the amendments include the following: (1) improved positive identification of those aircraft previously allowed to display small N-numbers when penetrating the ADIZ or DEWIZ; (2) improved verification of aircraft identification and enhanced ability of inspectors to determine noncompliance, such as whether a suspect aircraft had been stolen or the N-numbers falsified; and (3) increased effectiveness of Customs in concentrating interdiction efforts on suspicious aircraft not authorized to operate with fuel tanks installed in the passenger compartment or a baggage compartment. The FAA has been unable to quantitatively determine the extent to which Customs' drug interdiction efforts will be enhanced by this rule and resulting benefits. This difficulty is largely attributed to the fact that benefits of Customs, drug enforcement efforts represent a public good. This good does not subject itself to market evaluation. Thus, it is extremely difficult to evaluate these benefits in monetary terms. An indication of the potential benefits that could accrue from reduced drug abuse activity, due to enhanced drug interdiction, is shown in a 1984 report by the Research Triangle Institute. The report revealed that the economic cost to society of drug abuse amounts to approximately $64 billion annually.

Safety benefits are also expected to accrue from this rule. These benefits are related to the lowering of fatalities and serious injuries associated with operation of civil aircraft in active drug trafficking areas. A review of the National Transportation Safety Board's data base for drug-related accidents revealed that 127 fatalities and 33 serious injuries occurred between 1975 and 1984. During this period, these statistics equated to an annual average of 13 fatalities and 3 serious injuries related to drug trafficking activity. The rule is expected to have a positive impact on these grim statistics, though to what extent is not known by the FAA.

The regulatory evaluation that has been placed in the docket contains information in more detail related to costs and benefits that are expected to accrue from the implementation of this rule.

Regulatory Flexibility Determination

The FAA has determined that, under the criteria of the Regulatory Flexibility Act of 1980, amendments contained in this rule are not expected to have a significant economic impact on a substantial number of small entities. The responsibility for marking or providing I.D. plate information on existing aircraft is placed directly on the owner or operator of the aircraft. However, for new aircraft, the I.D. plate responsibility is placed on the applicant for airworthiness certificate, usually the manufacturer. This amendment will impose no additional cost on manufacturers since it only requires that the I.D. plate be located on the exterior rather than interior of the aircraft. The majority of small entities impacted by this rule represent operators of unscheduled aircraft for hire. These operators are expected to incur a one-time compliance cost ranging between $155 and $215. These costs are far below the annualized threshold of significant regulatory cost of $3,540. Therefore, this rule will not have a significant economic impact on a substantial number of small entities.

International Trade Impact Statement

All foreign and domestic manufactured aircraft sold in the United States need to be identified in accordance with the provisions of this rule. The cost of marking the aircraft is borne by individual domestic owners or operators only. This rule will not have an impact on trade opportunities for U.S. firms doing business overseas or for foreign firms doing business in the United States.

CONCLUSION:

The amendments contained in this FAA document involve only the cost of affixing N-numbers or data to aircraft belonging to a minor part of the aviation community. The benefits are unquantifiable in that the amendment will enhance safety as well as assist Customs in its drug interdiction efforts as requested. The cost imposed on small entities are below the annualized threshold of significant regulatory costs. Therefore, I certify that under the criteria of the Regulatory Flexibility Act, these amendments do not have a significant economic impact, positive or negative, on a substantial number of small entities, and a regulatory flexibility analysis is not required. In addition, for the same reasons, the amendments do not involve a major rule under Executive Order 12291. Because it involves important DOT policy, the rule is considered significant under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). A copy of the regulatory evaluation for this action is contained in the regulatory docket. A copy of it may be obtained by contacting the person identified under the caption "FOR FURTHER INFORMATION CONTACT."

Adoption of the Amendments

In consideration of the foregoing, Parts 43, 45, and 91 of the Federal Aviation Regulations (14 CFR Parts 43, 45, and 91) are amended effective December 8, 1987.

The authority citation for Part 43 continues to read as follows: *Authority*: 49 U.S.C. 1354, 1421 through 1430; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983).

Amendment 43-30
Inoperative Instruments or Equipment

Adopted: December 8, 1988 **Effective: December 13, 1988**

(Published in 53 FR 50190, December 13, 1988)

SUMMARY: These amendments revise the Federal Aviation Regulations (FAR) to permit rotorcraft, nonturbine-powered airplanes, gliders, and lighter-than-air aircraft, for which an approved Master Minimum Equipment List has not been developed, to be operated with inoperative instruments and equipment not essential for the safe operation of the aircraft. Furthermore, these amendments permit general aviation operators of small rotorcraft, nonturbine-powered small airplanes, gliders, and lighter-than-air aircraft, for which a Master Minimum Equipment List has been developed, the option of operating under the minimum equipment list concept or in accordance with the provisions of this final rule.

FOR FURTHER INFORMATION CONTACT: Edna H. French-Manager, Project Development Branch (AFS-850) or John Lynch; General Aviation and Commercial Division, Office of Flight Standards, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591; telephone (202) 267-8150.

SUPPLEMENTARY INFORMATION

PUBLIC PARTICIPATION: These amendments are based on SNPRM No. 81-14A. All interested persons have been given an opportunity to participate in making these amendments, and due consideration has been given to their comments. Except for the changes discussed below, these amendments and the reasons for their adoption are the same as those stated in Notice 81-14A.

Background

Except as provided for in § 91.30, all instruments and equipment installed on an aircraft must be in operative condition for an operator to continue to meet the aircraft's airworthiness requirements. The FAA recognized that flight could be conducted with instruments and equipment inoperative under specified conditions with the adoption of the minimum equipment list (MEL) concept. Presently, the MEL concept extends to air carrier, commercial, and general aviation operators of multiengine aircraft, but only if the aircraft has a master MEL. Owners or operators of aircraft for which master MEL's have not been developed are required to adhere to § 91.165 which requires that all aircraft discrepancies which occur between required inspections be repaired in accordance with Part 43. This means that all of the aircraft's instruments and equipment must be operative, regardless of whether or not they are essential for the operation being conducted.

The FAA addressed this issue for operators of general aviation multiengine aircraft by issuing Amendment No. 91-157 (44 FR 43714; July 26, 1979). This amendment permitted the operation of multiengine aircraft with inoperative instruments or equipment within the limitations of §§ 91.29 and 91.165. After Amendment No. 91-157 was published, the FAA received strong negative reaction from the public. Generally, the commenters objected, because they believed the rules were confusing, the time allowed for compliance was insufficient, and very few master MEL's had been developed at the time. Many commenters stated that they use the listing in § 91.33 as the sole standard for determining whether or not an instrument or item of equipment is required to be operational. Although the FAA intended to provide relief to the general aviation community by issuing Amendment No. 91-157, it was perceived as restrictive and criticized as excluding single-engine aircraft. Therefore, the FAA issued Amendment No. 91-160 on October 26, 1979 (44 FR 62884; November 1, 1979), suspending § 91.30 so the FAA could study the matter further.

Following the suspension of § 91.30, operators desiring to use MEL's petitioned for exemptions from § 21.181. This allowed operators to obtain individual approvals to operate multiengine aircraft with inoperative instruments and equipment. The FAA was able to gain valuable information on the usefulness and safety aspects of MEL's when used in general aviation operations. Even though this experience was beneficial, processing exemptions was time consuming and costly to both the FAA and the public. Before the FAA reinstated § 91.30 on March 13, 1986, over 350 individual exemptions were processed.

On September 16, 1981, the FAA issued Notice of Proposed Rulemaking (NPRM) No. 81-14 (46 FR 52278; October 26, 1981). This notice proposed permitting the operation of aircraft with inoperative instruments and equipment not essential for the operation being conducted. The proposal included provisions to consolidate all MEL requirements of Parts 121, 125, and 135 into Part 91. It also proposed to broaden the application of these provisions to other aircraft and to allow the operation of aircraft without an MEL with certain instruments or items of equipment inoperative through an approved aircraft flight manual or operating limitations statement. Even though this notice received more favorable response than Amendment No. 91-157, the general aviation community still had concerns and objections, and the FAA decided that the proposal needed further revision.

The FAA reinstated Amendment No. 91-157 (50 FR 51188; December 13, 1985) on December 6, 1985. This permitted operators of multiengine aircraft, under specific conditions, to operate their aircraft with inoperative instruments and equipment. The FAA, in making the decision to reinstate § 91.30, determined the reasons for suspending the rule no longer existed. However, as was the case when Amendment No. 91-157 was first published, aircraft for which master MEL's had not been developed were still excluded. The reinstatement of § 91.30 provided immediate relief to operators of multiengine aircraft, and allowed additional time for the FAA to resolve the problems confronting operators of other aircraft.

The FAA issued a Notice of Meeting announcement (51 FR 18800; May 22, 1986) to solicit public participation for this ongoing rulemaking project. The FAA determined that prior to initiating any further rulemaking projects involving this subject, it would request assistance from the public. On June 17, 1986, a public meeting was held at the FAA Headquarters in Washington, D.C. The meeting was attended by thirty-nine FAA and industry personnel. One of the principal industry comments was that requiring all instruments and equipments to be operative at all times was totally unacceptable. Furthermore, the attendees disagreed that § 91.165 requires all instruments and equipment to be operative at all times. Also, industry expressed a concern that the MEL approval process is unnecessarily burdensome for both Part 91 operators and the FAA. The attendees stated that the Flight Standards District Offices (FSDO) are already backlogged with priority work, and past experience has shown the minimum time to complete the MEL approval process is six months. The commenters stated that general aviation operators have operated safely for years, using the instrument and equipment listings in § 91.33 as their sole reference for determining whether an instrument or item of equipment was required for the operation being conducted. The attendees requested that the FAA develop rules to permit the operation of aircraft with inoperative instruments and equipment, and suggested they follow the procedures that operators have used successfully for years. On December 15, 1987, the FAA issued Supplemental Notice of Proposed Rulemaking (SNPRM) No. 81-14A (52 FR 47680), in which it proposed the rules that are contained in this final rule document. The FAA's intent in proposing the rules contained in Notice No. 81-14A was to provide a realistic approach to the inoperative instruments and equipment issue in response to the concerns of the general aviation community. The FAA determined that general aviation operators of small aircraft were in need of relief from § 91.165. In developing these amendments, specifically § 91.30(d), the FAA utilized a philosophy and rationale similar to that used in the development of the MEL concept.

In the past, many aircraft operators have incorrectly used the listing in § 91.33 as the sole standard for determining whether or not their aircraft met the requirements for the operation being conducted. With these new rules, the FAA provides a regulatory basis for the operation of these aircraft with inoperative instruments and equipment, when those instruments and equipment are not essential for the safe operation of the flight. These rules permit operation of aircraft with inoperative instruments and equipment within the framework of a controlled program of maintenance inspections, repairs, and parts replacements. It is imperative that the owner/operator exercise prudent judgment and at each required inspection, have any inoperative instrument or item of equipment inspected or repaired, as appropriate. In this good faith effort, the FAA has decided to conform §§ 43.11, 91.30, and 91.165 to the operational practices and procedures that the aviation public has requested.

Sections Affected

As a result of comments from the public and additional FAA review of Notice No. 81-14A, the FAA rearranged and renumbered some of the rules in this Final Rule document as compared to the

proposed rules contained in Notice No. 14A (52 FR 47680; December 15, 1987). The following comparison table shows these differences:

Comparison Between the Proposed Rules and the Final Rules

Notice No. 81-14A	*Final Rule*
§ 43.11(b)	§ 43.11(b)
§ 91.30(a)	§ 91 30(a)
§ 91.30(c)	§ 91.30(c)
§ 91.30(d)	§ 91.30(d)
§ 91.30(d)(1)	§ 91.30(d)(1)(i) and (ii)
§ 91.30(d)(2)	§ 91.30(d)(2)
§ 91.30(d)(3)	§ 91.30(d)(3)
§ 91.30(d)(4)	§ 91.30(d)(4)
§ 91.165(a)	§ 91.165(a)
§ 91.165(b)	§ 91.165(c)
§ 91.165(c)	§ 91.165(b)
§ 91.165(d)	§ 91.165(d)

Section 91.30(d) permits rotorcraft, nonturbine-powered airplanes, gliders, and lighter-than-air aircraft, for which master MEL's and approved MEL's have not been developed, to be operated with inoperative instruments and equipment. Additionally, operators of small rotorcraft, nonturbine-powered small airplanes, gliders, and lighter-than-air aircraft, for which master MEL's and approved MEL's have been developed, may elect to operate in accordance with an approved MEL or in accordance with the provisions of § 91.30(d).

The pilot-in-command, owner, or operator will be required to identify the inoperative instruments or equipment, consult the aircraft's approved flight manual or owner's handbook, and review § 91.30(d)(2). After the pilot-in-command ensures that an inoperative instrument or equipment is not required, the aircraft may depart, provided—

(1) The inoperative instrument or item of equipment is deactivated or removed, the cockpit control of the affected instrument or item of equipment is placarded with the word "Inoperative," and the discrepancy is recorded in the aircraft's maintenance records in accordance with § 43.9 of this chapter. If the inoperative instrument or item of equipment is being removed from the aircraft or if deactivation requires maintenance, a certificated and appropriately rated maintenance person will be required to accomplish the removal and maintenance task; and

(2) At the next required inspection, the inoperative instrument or item of equipment is repaired, replaced, removed, or inspected, as appropriate.

Section 91.165 has been revised by rewording and rearranging the current text into separate paragraphs and by adding procedures for returning an aircraft to service with inoperative instruments and equipment. The revision establishes a requirement for owners and operators to have any inoperative instrument or item of equipment repaired, replaced, removed, or inspected, as appropriate. Also, this revision will ensure that after the aircraft has been inspected, and if maintenance is being deferred, the owner/operator of that aircraft is aware and responsible for ensuring that maintenance persons have made the appropriate entries in the aircraft's maintenance records and properly placarded the inoperative instruments or equipment "Inoperative."

When repair of inoperative instruments and equipment is deferred after an inspection, a maintenance person will make a determination that the inoperative instruments and equipment will not affect the intended function of any other operable instruments and equipment. An entry will then be made in the aircraft maintenance records in accordance with § 43.11. A maintenance person will place a placard that meets the aircraft's airworthiness certification regulation [e.g., §§ 23.1541, 27.1541, etc.] on the inoperative instrument or cockpit control of the inoperative item of equipment.

A new sentence has been added to § 43.11(b) to provide for an aircraft to be returned to service with inoperative instruments and items of equipment. The person approving the aircraft for return to service after any annual, 100-hour, progressive, or unscheduled inspection will be required to placard any inoperative instruments and equipment, and shall make an entry in the aircraft's maintenance records describing the deficiencies. Subsequent inspections will require reevaluating the instrument/equipment and updating the entry in the aircraft records.

DISCUSSION OF COMMENTS TO NOTICE NO. 81-14

Sixty-five comments were received in response to Notice No. 81-14 (46 FR 52278; October 26, 1981), representing the views of manufacturers, associations, and individual operators. Generally, the comments favored rulemaking to provide relief for Part 91 operators to permit, under appropriate circumstances, operations with inoperative instruments and equipment. However, many commenters who favored rulemaking, strongly disagreed with the proposals contained in Notice No. 81-14. Therefore, the FAA withdrew the proposals.

The commenters were concerned with the operating limitations statements that were perceived as unnecessarily burdensome and time-consuming for both industry and the FAA, without commensurate improvement in safety. The FAA agreed and the proposal has been withdrawn.

Concerning the proposal to develop an MEL in the FAA Approved Airplane or Rotorcraft Flight Manual, the FAA agreed with the comments that further evaluation of the means required to implement the procedure is necessary before this proposal can be adopted. Accordingly, the FAA has withdrawn the proposal to include MEL's in FAA Approved Airplane or Rotorcraft Flight Manuals.

Notice No. 81-14 proposed adding a new paragraph (g) to § 91.33 to permit operators of general aviation aircraft (for which a master MEL has not been developed) to be operated with inoperative instruments and equipment. After further consideration on how best to approach this matter, it was decided that proposed paragraph (g) should not be in § 91.33. Therefore, the FAA has withdrawn the proposal to add a new paragraph (g) to § 91.33.

In an effort to standardize and simplify the regulatory procedures applicable to operations with inoperative instruments or equipment, the FAA proposed to consolidate the MEL requirements contained in Parts 121, 125, and 135 into a single regulation under Part 91. The FAA has determined that this proposal should be addressed through separate rulemaking, and therefore, the proposal has been withdrawn.

The National Business Aircraft Association (NBAA) and 19 other commenters supported the proposal to allow Part 91 operators to use an approved MEL. However, the commenters suggested the master MEL's were developed for air carriers and include references to equipment (such as flight data and voice recorders) that may not be applicable to private operators. Commenters suggested these references should be eliminated from the master MEL. A master MEL originates when an aircraft is type certificated, and the master MEL is developed for the aircraft type, regardless of the aircraft's intended use. Any operator (air carrier or private) may use the master MEL as a guide to develop an MEL for a specific aircraft with specified operational requirements. Although private operators may not have the same instrument or equipment requirements as air carriers, the FAA does not agree that instruments and equipment should be eliminated from the master MEL.

DISCUSSION OF COMMENTS TO SNPRM NO. 81-14A

One hundred seventy-four comments were received in response to Notice No. 81-14A (52 FR 47680), representing the views of manufacturers, associations, and individuals. One hundred and two commenters favored the proposals contained in Notice No. 81-14A, six were against, and sixty-six appeared to not understand that the proposals provided relief from the current rules.

The six commenters opposed to the proposals of Notice No. 81-14A, objected to the proposal on the grounds that they believe the current rule (i.e., § 91.33) is adequate in ensuring that an aircraft is operated with the proper instruments and equipment. Although many pilots believe the provisions of § 91.33 are the only requirements for determining whether or not an instrument or an item of equipment is needed for an aircraft to be considered airworthy for flight, they are not correct. Though many of the required instruments and equipment are covered by § 91.33, there are additional requirements. Some of these requirements are covered in an aircraft's applicable airworthiness certification regulations. Also, there are added requirements contained in an aircraft equipment list, kinds of operations equipment list, or aircraft flight manual. In addition, there are other instruments and equipment requirements listed in Part 91 (e.g., §§ 91.24, 91.90, etc.). Also, there are airworthiness directives (AD) that require certain instruments and equipment to be operational. As an example, AD 82-06-10 requires that a Cessna 210 have two operational vacuum pumps prior to entering IFR conditions. Considering these numerous airworthiness requirements, the FAA has determined that

rules, as proposed in Notice No. 81-14A, are needed to ensure that aircraft are properly equipped for flight. Therefore, the rules proposed in Notice No. 81-14A remain unchanged.

One commenter believes there must be a safety requirement shown to justify establishing new rules. The commenter suggested that present and past accident rates do not justify issuing new rules. The FAA does not use accident and incident data as the sole basis for proposing or establishing new rules. The FAA agrees that past accident and incident records show a minimal number of accidents and incidents caused by inoperative instruments and equipment, but the purpose of these new rules is to clarify the language in the existing rules to provide greater flexibility to Part 91 operators. Therefore, the rules as proposed in Notice No. 81-14A remain unchanged.

Several commenters suggested that the FAA expand the provisions of § 91.30(d) to include turbine-powered airplanes. The FAA decided not to include turbine-powered airplanes because operators of some of these aircraft may already use an MEL. This relief was granted to operators of multiengine turbine-powered airplanes when the FAA reinstated § 91.30 on December 13, 1985 (Amdt. No. 91-192; 50 FR 51188). In addition, the FAA decided to hold operators of these airplanes to a higher standard of safety, since these airplanes are more complex, are frequently involved in transporting a larger number of passengers, and operate more often in complex, high density airspace. Therefore, the rules as proposed in Notice No. 81-14A remain unchanged.

Several commenters suggested that the FAA expand the provisions of § 91.30 to include aircraft that are operated under Part 135. Currently, the FAA is working on a separate MEL rulemaking project to address aircraft operating under Part 135. Therefore, the rules as proposed in Notice No 81-14A remain unchanged.

One commenter suggested that gliders be included in § 91.30(d). The FAA's intent in proposing the rules contained in Notice No. 81-14A was to provide a realistic approach to the inoperative instruments and equipment issue in response to the concerns of the general aviation community. Therefore, the FAA has clarified § 91.30(d) to specifically identify gliders and lighter-than-air aircraft as falling within the applicability of this rule.

Several commenters objected to the placarding requirements of § 43.11(b), 91.30(d)(3), and 91.165(d). The placarding requirement is a very simple procedure that will require a pilot or mechanic to place a placard on the inoperative instrument or cockpit control of an item of equipment marking it "Inoperative." This procedure can be as simple as writing the word "Inoperative" on a piece of masking tape or piece of paper and attaching it to the instrument or cockpit control. The purpose of the placarding requirement is to provide an additional safeguard for future users and maintenance personnel for ensuring they are aware of a discrepancy. Therefore, the rules as proposed in Notice No 81-14A remain unchanged.

A few commenters requested clarification on who could placard inoperative instruments or cockpit controls of inoperative equipment. Placards required by § 91.30 are operational in nature, and may be installed by certificated and appropriately rated pilots, or by persons certificated and appropriately rated to perform maintenance on the aircraft. At the first and each succeeding required inspection, placards required by § 91.165 may be installed only by the following certificated and rated persons: (1) The holder of a mechanic certificate; (2) The holder of a repairman certificate when performing those maintenance services for a certificated repair station; (3) Persons working under the supervision of a holder of a mechanic or repairman certificate; (4) The holder of a repair station certificate; (5) The manufacturer of the aircraft who holds a manufacturer's maintenance facility certificate. After further review of these comments, the FAA has revised and rewritten § 91.30(d)(3). The phrase "by a person authorized in § 43.3 of this chapter" has been deleted. The purpose of this change is to alleviate the confusion of who can placard inoperative instruments and cockpit controls.

One commenter questioned whether the kinds of aircraft provided for in these new rules would also be covered if the aircraft were operated in accordance with Parts 133, 137, or 141. Aircraft operated under these parts must comply with the operational and maintenance rules of Part 91, in addition to the rules of Parts 133, 137, or 141. Therefore, these aircraft are also covered by the provisions of these new rules.

One commenter questioned whether an individual who has an approved MEL could alternate between complying with the MEL or the provisions of § 91.30(d). The FAA intended § 91.30(d) to require any person having an approved MEL to use that MEL. If a person has an approved MEL and elects to operate under the provisions of § 91.30(d), then that person will be required to surrender the MEL and Letter of Authorization to the Flight Standards District Office having jurisdiction. Therefore, § 91.30 (c) and (d) have been rewritten to clarify this matter. One commenter pointed out an incorrect reference in the text of § 43.11(b). The commenter's question regarded a reference to "§ 135.41(a)(1)." This was a typographical error, and the reference should have been "§ 135.411(a)(1)." Therefore, § 43.11(b) has been revised to reflect this change.

A few commenters requested clarification of the term "deactivated" in § 91.30(d)(3)(ii). Depending on the specific instrument or item of equipment, the term "deactivated" may mean a process as simple as the pilot pulling a circuit breaker to the "open" or "off" position, or as complex as rendering instruments or equipment totally inoperable by complex maintenance tasks requiring a certificated and appropriately rated maintenance person to perform the deactivation. For example, the procedures for "deactivating" certain models of gasoline cabin heaters are to disconnect and cap off fuel supply lines at their sources, disconnect all electrical lines at their sources, and disconnect the electrical ignition. In other instances, deactivation may be accomplished by a certificated and appropriately rated pilot, provided the maintenance tasks required to "deactivate" an instrument or item of equipment are preventive maintenance as prescribed in paragraph (c) of Appendix A, Part 43. When these tasks are not preventive maintenance, "deactivation" must be accomplished by a certificated and appropriately rated maintenance person. After further review of these comments, the FAA has revised and rewritten § 91.30(d)(3). The phrase "by a person authorized in § 43.3 of this chapter" has been deleted. The purpose of this change is to alleviate the confusion of who can deactivate inoperative instruments and equipment.

One commenter requested clarification concerning the length of time an inoperative instrument or item of equipment could remain inoperative after deactivation or removal. Sections 91.29(b) and 91.30(d)(4) require a person to determine whether an aircraft with inoperative instruments and equipment is in condition for safe operation. In addition, § 91.165(c) requires at every required inspection thereafter, the owner/operator of the aircraft to have any inoperative instrument and equipment reevaluated to ensure the discrepancy will not affect the operation of any other installed instrument or equipment. Therefore, the FAA believes compliance with §§ 91.29(b), 91.30(d)(4) and 91.165(c) will provide adequate safeguards without having to impose time limits on the repair or replacement of inoperative instruments and equipment.

Several commenters requested clarification of the phrase "next required inspection" contained in § 91.165(c). The phrase "next required inspections", as contained in § 91.165(c), are those inspections required to be conducted by:

(1) Section 91.169(a)(1), (b), or (d);

(2) An inspection program selected under the provisions of § 91.169(e) and (f);

(3) Section 135.411(a)(1); or

(4) Inspections and maintenance programs selected under the provisions of Part 125. A few commenters requested advice on whether it would be better for them to operate under an MEL or the provisions of § 91.30(d). An MEL provides a precise list of instruments, equipment, and both operational and maintenance procedures that permit an aircraft to be operated with inoperative instruments and equipment. Under the MEL concept, those instruments and equipment not covered in the approved MEL would be required to be operative at all times regardless of the operation being conducted. The new § 91.30(d) requires only those instruments and equipment listed in § 91.30(d)(2) to be operative. Those instruments and equipment not listed in § 91.30(d)(2) would be permitted to be inoperative.

However, in comparing the two methods, certain instruments and equipment permitted to be inoperative by an MEL would not be permitted to be inoperative by § 91.30(d)(2). As an example, the master MEL for the Cessna 310, 320, 335, and 340 airplanes allow for the fuel quantity indicators of these airplanes to be inoperative. If these same airplanes were operating in accordance with § 91.30(d), these indicators will be required to be operative. However, the master MEL for these airplanes require that specific operational and maintenance procedures be developed to provide an equivalent level of safety.

The FAA believes that individuals must evaluate their own circumstances and situations and make their own decisions. Persons who lease their aircraft to multiple users may want strict, well defined procedures for renters to follow and may elect to obtain an approved MEL. Whereas, a person who is the only user of an aircraft may find the process of obtaining an approved MEL to be burdensome and unnecessary, and may elect to operate under § 91.30(d). Each person electing to obtain an MEL and a Letter of Authorization for an aircraft must ensure that others using that aircraft know the MEL discrepancy and logging procedures.

The term "multiengine" referenced in the proposed § 91.30(d)(1) has been deleted from the final rule, because the FAA is developing master MEL's for single engine aircraft. This deletion allows operators of single engine aircraft to use the MEL concept if desired. Therefore, § 91.30(d)(1)(i) and (ii) have been revised to reflect this change.

One commenter suggested that the removal of certain kinds of avionics equipment be added to the list of items classified as preventive maintenance in Part 43. The FAA recognizes that in some instances this may be appropriate. However, the FAA has determined there is not sufficient data on which to base a decision that any and all such removals can be safely classified as preventive maintenance. Therefore, the rules as proposed in Notice No. 81-14A remain unchanged.

One commenter questioned the use of upper case letters for the phrase "Type Certificate Data" contained in the text of § 91.30(d)(2)(i). The commenter stated that the use of upper case letters is misleading and would imply there is a document by that name. Subsequently, the FAA has determined that type certificate data information is not readily available to pilots, and the airworthiness certification regulations already cover this information. Therefore, the phrase, "Type Certificate Data" has been deleted, and § 91.30(d)(2)(i) has been revised to reflect this change.

Two commenters point out that some aircraft manufacturers have not made "aircraft equipment lists" or "kinds of operation equipment lists" available to aircraft owners. The commenters recommend the phrase "if available" be added to § 91.30(d)(2)(ii). The commenters did not provide any specific examples to support their claim, and the FAA is not aware of any aircraft not having an Aircraft Equipment List, a Kinds of Operation Equipment List, or some other acceptable equipment list. The rules [i.e., §§ 23.1583(h), 25.1583(e), 25.1525, 27.29, 27.1525, 27.1583(e), 29.29, 29.1525, and 29.1583(e)] contained in the aircraft certification regulations require an aircraft manufacturer to make information available on the kinds of operation in which an aircraft may or may not be used. Any installed equipment that affects any operating limitation must be listed and identified as to the operational function. Therefore, the rules as proposed in Notice No. 81-14A remain unchanged.

Fairchild Industries proposed an alternative to these new rules. Fairchild Industries petitioned the FAA to amend §§ 91.30 and 135.179 to require the FAA and aircraft manufacturers to establish a list of required instruments and equipment to be included in each airplane and rotorcraft flight manual. This list would be used by a pilot to determine what instruments and equipment are required to begin and/or continue a flight. The FAA has determined this petition has merit and will give it further consideration. However, since the petition is outside the scope of Notice Nos. 81-14 and 81-14A, the rules as proposed in Notice No. 81-14A remain unchanged.

Several commenters incorrectly believed that proposed § 91.30(d) would require an aircraft's instruments and equipment to be operative at all times. Operators complying with § 91.30(d) may operate aircraft with certain instruments and equipment inoperative. Persons who elect to operate their aircraft in accordance with § 91.30(d) will not have to go through the process of developing an MEL and getting it approved. The FAA sent a copy of Notice No. 81-14A and a letter explaining these new rules to every commenter who had this misunderstanding of § 91.30(d).

REGULATORY EVALUATION

Regulatory Evaluation Summary

The FAA conducted a regulatory evaluation of this final rule, which is included in the regulatory docket. The FAA determined that this final rule is consistent with the objective of Executive Order 12291 as part of the President's regulatory reform program to reduce regulatory burdens on the public.

Benefits

Implementing these rules enhances the flexibility of a regulatory requirement necessary for safety, provides greater operational flexibility to general aviation operators, and reduces the administrative workload for the FAA.

These amendments provide relief to Part 91 operators of rotorcraft and nonturbine-powered airplanes (not being utilized in an air carrier operation) from current rules that absolutely prohibit operation of these aircraft with inoperative instruments or items of equipment. These aircraft will be permitted to operate with inoperative instruments and equipment that are not needed for a particular type of operation (e.g., night lighting equipment would not be required to be operable during day VFR operations) pursuant to § 91.30.

These revisions to §§ 91.30, 91.165, and 43.11 provide cost savings to Part 91 operators by reducing aircraft downtime and eliminating the cost to repair the inoperative instrument or item of equipment not needed for a particular type of operation.

Costs

Part 91 operators of rotorcraft, gliders, nonturbine-powered airplanes, and lighter-than-air aircraft who use § 91.30 to operate with inoperative instruments or items of equipment, will incur negligible costs as a result of the placarding requirements. These additional costs result from having a person, who is returning an aircraft to service after completion of a required inspection, determine that the inoperative instrument or equipment does not affect the intended function of any operable instrument or equipment or the airworthiness of the aircraft, and then placard the inoperative instrument and/or cockpit control of an item of equipment. Placarding an inoperative instrument or item of equipment may be as simple as writing the word "Inoperative" on piece of masking tape and placing the tape on the instrument or cockpit control. Therefore, these revised rules impose only negligible costs, satisfy the airworthiness requirements of the maintenance rules, increase operational flexibility, and reduce costs by allowing an aircraft to be operated with certain inoperative instruments and equipment.

This rule imposes no new requirements on Part 91 operators of aircraft for which master MEL's have been developed. Finally, this rule imposes no new requirements on the Federal Government (FAA). Based on the aforementioned discussion of the benefit and cost aspects of the proposed rule, the FAA finds these revised rules to be cost effective.

International Trade Impact Statement

This rule will not influence or affect international trade involving aviation products or services. Furthermore, no comments on Notice Nos. 81-14 and 81-14A concerning international trade were received. Therefore, the FAA certifies that this rule will not eliminate existing or create additional barriers to the sale of foreign aviation products or services in the United States and will not eliminate existing or create additional barriers to the sale of U.S. aviation products and services in foreign countries.

Regulatory Flexibility Determination

The Regulatory Flexibility Act (RFA) of 1980 was enacted by Congress to ensure that small entities are not disproportionately affected by Government regulations. The RFA requires agencies to review rules which may have a "significant economic impact o a substantial number of small entities."

These revised rules will impose negligible costs, as a result of the new requirement to placard inoperative instruments and equipment, on some operators of general aviation rotorcraft, gliders, nonturbine powered airplanes and lighter-than-air aircraft.

Therefore, the FAA certifies that these revised rules will not have a significant economic impact on a substantial number of small entities.

Comments Received on NPRM

Twenty-eight comments concerning the regulatory evaluation were received in response to Notice Nos. 81-14 and 81-14A. These comments do not affect the regulatory evaluation of this final rule and are discussed above in the section titled "Discussion of Comments to Notice No. 81-14" and "Discussion of Comments to SNPRM No. 81-14A" of this document.

Paperwork Reduction Act

Information collection requirements contained in §§ 43.11 and 91.30 have been approved by the Office of Management and Budget under the provisions of the Paperwork Reduction Act of 1980 (Pub. L. 96-511) and have been assigned OMB Control Nos. 2121-0020 and 2120-0522, respectively.

Federalism Implications

These revised rules will be enacted under the authority of the Federal Aviation Act of 1958, as amended (49 U.S.C. 1301, et seg.). This statute preempts State law regulating aviation safety. Therefore, in accordance with Executive Order No. 12612, these revised rules do not have federalism implication warranting the preparation of a federalism assessment.

Conclusion

Amendment Nos. 43-30 and 91-206 permit rotorcraft, gliders, nonturbine-powered airplanes, and lighter-than-air aircraft to be operated with certain instruments and equipment inoperative that are not essential for the safe operation of the aircraft. As was previously stated in the Regulatory Evaluation section of this document, unnecessary maintenance and operational costs may be required by the current rules in Part 91. Operators of these types of aircraft will benefit from the relief permitted by Amendment Nos. 43-30 and 91-206, and the additional costs are minimal. Accordingly, the FAA has determined that these amendments do not involve a rule change that is major under Executive Order 12291 or significant under Department of Transportation Policies and Procedures (44 FR 11034; February 26, 1979). Although numerous small operators may be impacted by these amendments, the impact will be minimal since the costs of operating pursuant to § 91.30 do not exceed the FAA's criteria for "significant economic impact." For the reasons stated above, and in accordance with the Regulatory Flexibility Act, I certify that these amendments will not have a significant economic impact on a substantial number of small entities.

ADOPTION OF THE AMENDMENT

Accordingly, Parts 43 and 91 of the Federal Aviation Regulations (14 CFR Parts 43 and 91) are amended effective December 13, 1988.

The authority citation for Part 43 continues to read as follows:

Authority: 49 U.S.C. 1354, 1421 through 1430; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983).

Amendment 43-31

Revision of General Operating and Flight Rules

Adopted: August 7, 1989 **Effective: August 18, 1990**

(Published in 54 FR 34284, August 18, 1989)

SUMMARY: This amendment reorganizes and realigns the general operating and flight rules to make them more understandable and easier to use. Also, several changes are made to provide more flexibility for certain operations. These changes result from comments received from the general public and aviation industry in response to a request for specific comments to help identify substantive areas needing review.

EFFECTIVE DATE: This amendment becomes effective on August 18, 1990, except that § 91.203(a)(2) becomes effective September 18, 1989, and remains numbered as § 91.27(a)(2) until August 18, 1990.

FOR FURTHER INFORMATION CONTACT: William T. Cook (202) 267-3840 or Edna French (202) 267-8150, Project Development Branch (AFS-850), General Aviation and Commercial Division, Office of Flight Standards, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591.

SUPPLEMENTARY INFORMATION:

Background

On August 9, 1978, the Aircraft Owners and Pilots Association (AOPA) petitioned the Federal Aviation Administration (FAA) to revise Part 91 of the Federal Aviation Regulations (FAR) to make the regulations simpler and more comprehensible. In response to this petition, on January 11, 1979, the FAA issued an Advance Notice of Proposed Rulemaking (ANPRM) No. 79-2 (44 FR 4572; January 22, 1979) consisting of a verbatim publication of AOPA's proposal.

The FAA received 106 comments in response to the ANPRM. An overwhelming majority of the commenters supported the intent of the proposal to reorganize Part 91. However, there were numerous problem areas identified by the commenters relating to the proposed changes that were considered substantive.

On November 18, 1980, the FAA formed a Part 91 Working Group to analyze the AOPA proposal and comments received on the ANPRM. It was determined that certain technical and administrative problems existed and that it was not feasible to undertake a substantive revision of Part 91 at that time. Subsequently, AOPA withdrew its petition. However, review of AOPA's proposal to reorganize and renumber Part 91 revealed that many of the changes had merit and could be implemented. The FAA Part 91 Working Group concluded that the reorganization and renumbering of Part 91 would be the first step to improve the regulation and make it more understandable and easier to use. Consequently, the FAA published NPRM No. 79-2A (46 FR 45256; September 10, 1981), which proposed to reorganize and realign the general operating and flight rules to make them more understandable and easier to use. Other proposals were made to delete redundancies and obsolete compliance dates and to make other minor changes.

Notice No. 79-2A did not contain any substantive changes; however, it did inform the public that the FAA considered that notice to be the first step in a regulatory review of Part 91 consistent with the objective of Executive Order 12291. With this in mind, the FAA invited additional specific comments to help identify substantive areas to be reviewed and possibly included in subsequent proposals concerning Part 91. The notice further stated that the FAA would not take final action concerning the reorganization until substantive changes were proposed and the public had been given an opportunity to comment on those proposals.

The FAA published Notice No. 79-2B (46 FR 60461; December 10, 1981) to extend the comment period for Notice No. 79-2A by 120 days. That notice was issued in response to a petition from the National Business Aircraft Association to allow additional time for commenters to prepare substantive comments.

The FAA received 69 comments in response to Notice No. 79-2A. The majority of these comments favored the proposal and were discussed in Notice No. 79-2C (50 FR 11292; March 20, 1985).

Notice 79-2C proposed four substantive changes in addition to the numerous changes made to reorganize and clarify existing rules. Two of these changes were made in response to comments received from the public. These changes are as follows:

(1) Section 91.117—Allows reciprocating-powered aircraft to be operated at 200 knots in an airport traffic area;

(2) Section 91.135—Allows operators desiring authorizations to deviate from positive control area and route segment requirements to utilize a 48-hour oral notification system;

(3) Section 91.409—Allows operators of turbine-powered rotorcraft to use an alternate inspection program, such as an FAA-approved inspection program; and

(4) Sections 91.205, 91.509, and 91.511—Defines "shore" as it is used in these sections to exclude tidal flats.

Public Comments

Forty-seven comments were received in response to Notice No. 79-2C. A number of commenters recommended regulations that were not proposed in the notice. Because such comments discuss matters which the public has not had an opportunity to consider, they are beyond the scope of the notice and cannot be considered without further notice and public participation. Some of these comments concern proposals that will be considered by the FAA in future rulemaking and, therefore, could be published in a future notice.

There were two areas in particular where several proposals were received that are not within the scope of the notice. First, 11 comments specifically request that balloons be excepted from certain requirements now pertaining to aircraft in general. These comments seek substantive change to the existing regulations not proposed in the notice.

Second, a number of commenters propose substantive changes to the regulations with regard to rotorcraft. Although these comments are not within the scope of this rulemaking, they were considered in the Rotorcraft Regulatory Review Program, Notice No. 5.

Two commenters are opposed to changing masculine references to "airman" to read "he or she." One commenter states that this would keep the text shorter and speed up the reading of the text. The other commenter states that § 1.3(a)(3) already provides that "words importing the masculine gender include the feminine," and the better course would be to refer to the "person," or the "pilot." The FAA agrees with these commenters. Accordingly, references throughout Part 91 that use the words "he" or "she" have been changed to refer to the "person," the "pilot," the "crewmember," or the "Administrator."

One commenter writes that the use of "pilot in command" and "PIC" is inconsistent in the proposed rules. The FAA agrees with this commenter and, accordingly, has changed references to "PIC" in §§ 91.123(a) and 91.129(b) to "pilot in command" to make their use consistent throughout Part 91.

A commenter suggests that all references to distances expressed in miles should state whether they are statute or nautical miles. The FAA agrees that such references should be clear. Accordingly, references to distance expressed in miles in §§ 91.171(b)(4)(ii) and 91.207(e)(3) are changed by adding the word "nautical" to reflect that the distances are expressed in nautical miles since they reference ground-measured distance. References to visibilities in §§ 91.155(b), 91.167(b)(2)(ii), and 91.303(e) are changed by adding the word "statute" to reflect that visibilities are expressed in statute miles.

Several commenters state that the proposed wording for § 91.1 implies that operations of moored balloons, kites, unmanned rockets, and unmanned free balloons are governed by Part 103. This comment has merit and § 91.1 is revised by adding a specific reference to Part 101 after the phrase "unmanned free balloons" to make clear that moored balloons, kites, unmanned rockets, and unmanned free balloons operate under Part 101.

Another commenter requests clarification of the discussion of § 91.7 in Notice No. 79-2C, where the FAA states that there is no provision for the use of an approved Minimum Equipment List (MEL) in Part 91 operations, whereas § 91.213 permits the use of an approved MEL. The FAA points out that at the time Notice No. 79-2C was published, the effective date of current § 91.30 (proposed § 91.213) was stayed indefinitely (44 FR 62884; November 1, 1979). Amendment No. 91-192 (50 FR 51188; December 13, 1985) which took effect on March 13, 1986, terminated the stay.

Section 91.7(b), which was proposed without substantive change from existing § 91.29, provides that a flight should be discontinued when unairworthy mechanical or structural conditions occur. One commenter suggests that this be changed by deleting "mechanical or structural" and making it more general so as to provide for a possible unairworthy electrical system. This suggestion raises a valid point; however, the FAA has determined that the rule should be amended to explicitly reference mechanical, electrical, or structural conditions. Therefore, § 91.7(b) is amended accordingly.

As suggested by one commenter, § 91.21(a)(1) is amended by deleting reference to a "commercial operator." This revision conforms § 91.21(a)(1) with SFAR 38-2 and Part 125 which do not provide for a commercial operator's certificate and, instead, provide for the issuance of either an "air carrier operating certificate" or an "operating certificate."

One commenter states that consideration should be given to better defining "appropriately rated pilot" in § 91.109 and provide a definition. The FAA agrees that the phrase "appropriately rated pilot" should be defined better.

The preamble to Amendment No. 91-36 (32 FR 260; January 11, 1967) states that an "appropriately rated pilot" in § 91.21(b) requires a private pilot certificate with an airplane category rating, a multiengine class rating for a small multiengine land plane, and a type rating for a large airplane or a turbojet-powered airplane (large or small).

Accordingly § 91.109(b)(1) is amended to require that the safety pilot hold at least a private pilot certificate with category and class ratings appropriate to the aircraft being flown.

One commenter urges the FAA to reinsert the current rule regarding visual descent points (VDPs) (current § 91.116). VDPs are not an integral part of the approach procedure. An aircraft that is not equipped to identify a VDP has the same approach minima as a similar aircraft that is equipped to identify the VDP.

Mandatory use of VDPs is considered inappropriate for a number of reasons:

(1) VDPs that use Distance Measuring Equipment (DME) fixes may, because of displacement factors and/or fix errors, result in descent angles that are either too shallow or too steep for the approach.

(2) A mandatory VDP rule discourages the purchase and use of the very equipment necessary to identify the VDP. This is so because compliance can only be required of those aircraft that are equipped to identify the VDP.

For these reasons, the final rule, like the NPRM, does not include a mandatory VDP requirement.

Notice No. 79-2C proposed that § 91.175(a) read: "Unless otherwise authorized by ATC, when an instrument letdown to a civil airport is necessary, each person operating an aircraft, except a military aircraft of the United States, shall use a standard instrument approach procedure prescribed for the airport in Part 97 of this chapter." The lead-in clause is changed to read, "Unless otherwise authorized by the Administrator," because ATC does not have the authority to approve a person's non-compliance with this rule.

Several commenters raise objections to proposed § 91.203(a)(2), which would prevent an aircraft from operating outside of the United States under the temporary authority of the pink copy of the Aircraft Registration Application as provided in § 47.31(b). The commenters assert that the proposal is a substantive change and not a clarification of the present rule; and that the FAA should consider the economic impact on the industry, the consumers, and the historical precedence of past practices. These commenters suggest that the FAA withdraw the proposal and acknowledge the pink copy of the application as a temporary certificate of registration.

Another commenter is of the opinion that the FAA has not provided discussion, as required by Executive Order 12291, on the economic impacts that would result from the delay between application for an issuance or denial of the registration certificate, under the proposals, in the NPRM. The commenter maintains that future investment purchases and leases would also be adversely affected. Several commenters also question the regulatory consistency that the FAA claims as the basis for the change.

These comments were responded to in full in a Notice of Legal Opinion issued December 1988 (53 FR 50208; December 14, 1988). That Notice of Legal Opinion stated that the limitation of temporary authority to operate an aircraft without registration to domestic operations (as also provided in new

§ 91.203(a)(2)) reflects current U.S. law and practice. Concerning the economic impact of this ruling, the FAA in that Notice of Legal Opinion answered:

> The aviation community has always been able to transfer ownership and register their aircraft with minimal difficulty. In order to mitigate the potential hardship that could result from grounding an aircraft used in international operations, pending receipt of a registration certificate, the Registry will, upon request, telex a copy of the Certificate of Aircraft Registration to the individual whose name appears on the application as the registered owner of the aircraft. The telex copy is issued after confirmation of the information contained on an Aircraft Registration Application and determination of eligibility for registration. The telex, which reflects critical and verified information resulting from the evaluation by the Registry of an application for aircraft registration, may be used as a temporary Certificate of Aircraft Registration until the original certificate is forwarded for carriage in the aircraft.
>
> This telex certificate will assist owners who submit an application for aircraft registration and who wish to operate the aircraft as soon as possible in international operations. Since the telex, by its terms, is a form of registration certificate, the aircraft may be operated in international air navigation consistent with Article 29 of the Convention [Convention on International Civil Aviation (61 Stat. 1180; T.I.A.S. 1591; 15 U.N.T.S. 295)]. The Registry will telex this copy within a matter of days—often within 48 hours—to be kept in the aircraft until the original Certificate of Aircraft Registration (AC Form 8050-3) is forwarded to the registered owner.

Accordingly, the FAA has determined that the rule should be amended as proposed, and consistent with the Chief Counsel's legal opinion, to provide explicitly that operations of aircraft outside the United States for which an application for registration has been submitted but certificate of registration has not been issued are not authorized under the Federal Aviation Regulations.

Several judicial decisions have defined the "shore" as including tidal flats. In some parts of the United States, these tidal flats can extend for several miles and, because of the extreme tides prevalent in these areas, the land may be submerged under as much as 25 to 35 feet of water during periods of high tide. The intent of the rule is to require operators carrying passengers for hire over these areas to equip their aircraft with the necessary flotation gear and pyrotechnic devices. Therefore, "shore," when it is used in §§ 91.205, 91.509, and 91.511, is defined to exclude land areas, such as tidal flats, which are intermittently under water.

An incorrect reference to "§ 91.169" was used in proposed § 91.409(e), which has been corrected to "§ 91.409" in the final rule.

It was pointed out by several commenters that the word "stop" in § 91.605(c)(2) was inadvertently included in the proposal and should be deleted. The commenters are correct, and the final rule has been amended accordingly. Also, the word "if" following the word "distance" in that same sentence has been corrected to read "is."

In addition to the specific changes discussed above, minor changes have been made in the wording of the regulations proposed in Notice No. 72-2C. In § 91.3(b), the word "in-flight" has been inserted to clarify that the deviation authority of § 91.3 applies only to in-flight emergencies which affect the safe completion of the flight.

The original intent of § 91.3 was to allow the pilot in command to deviate from certain regulations in the event of an in-flight emergency. Over time, regulations involving non-flight items were inserted into Subparts A and B, while flight-related regulations were inserted in other Subparts. Therefore, the word "in-flight" is being added to return the language to its original intent.

Other changes are nonsubstantive in nature. Except for such minor revisions, those parts of the proposal for which there were no comments are adopted as proposed. Finally, all other sections of Part 91 remain unchanged except for renumbering (see the cross-reference lists below).

Several amendments to Part 91 adopted since Notice No. 79-2C were published are reflected in the final rule. Where reference to other sections of this part were set forth in an amendment, the references have been changed to reflect the appropriate sections as used in the final rule. Those required changes published in the Federal Register prior to June 19, 1989, are discussed below.

Amendment No. 91-188, (50 FR 15380; April 17, 1985) amended current § 91.11, which governs the use of alcohol or drugs by any crewmember performing duty during the operation of an aircraft. This amendment took effect on June 17, 1985. Subsequently, Amendment No. 91-194 (51 FR 1229; January 9, 1986) amended § 91.11(c) to impose a requirement for a crewmember to furnish the results of any test that indicates percentage by weight of alcohol in a crewmember's blood. This amendment took effect on April 9, 1986. Proposed § 91.17 has been revised accordingly.

Amendment No. 91-189 (50 FR 31588; August 5, 1985) removed references to "expect approach clearance time" in § 91.127. This amendment took effect on September 4, 1985. Section 91.185 reflects this amendment.

Amendment No. 91-190 (50 FR 45602; November 1, 1985) added a new paragraph (c) to current § 91.24. This amendment took effect on December 2, 1985. This new paragraph required all aircraft equipped with an operable radar beacon transponder be turned on while airborne in controlled airspace. Subsequently, § 91.24(c) was amended by Amendment No. 91-203 (53 FR 23374; June 21, 1988). Proposed § 91.215(c) has been redesignated as paragraph (d) and the changes brought about by Amendment Nos. 91-190 and 91-203 have been incorporated into revised § 91.215(c).

Amendment No. 91-191 (50 FR 46877; November 13, 1985) amended current § 91.14 (proposed § 91.107) by revising the title and the section to include reference to shoulder harnesses. This amendment took effect on December 12, 1985. Section 91.107 has been revised accordingly. Amendment No. 91-191 also added a new paragraph to current § 91.33 which requires a shoulder harness for specified seats in normal, utility, and acrobatic category airplanes with a seating configuration, excluding pilot seats, of nine or less, manufactured after December 12, 1986. This paragraph appears as § 91.205(b)(15).

Amendment No. 91-192 (50 FR 51189; December 13, 1985) terminated the suspension of Amendment No. 91-157 (44 FR 43714; July 26, 1979) staying the effective date of current § 91.30. This amendment took effect on March 31, 1986. Subsequently, Amendment No. 206 (53 FR 50195; December 13, 1988) amended § 91.30. Section 91.213 reflects these amendments.

Amendment No. 91-193 (50 FR 51193; December 13, 1985) changed the FAA's description of North Atlantic (NAT) Minimum Navigation Performance Specifications (MNPS) airspace to coincide with the International Civil Aviation Organization's (ICAO's) description of the NAT MNPS airspace. This has been reflected accordingly in Section 1 of Appendix C of this final rule.

Amendment No. 91-195 (51 FR 31098; September 2, 1986) corrects the reference to the Department of Defense office in current § 91.102 restricting the flight of aircraft near space flight operations. This amendment took effect on September 15, 1986. Section 91.143 reflects this amendment.

Amendment No. 91-196 (51 FR 40692; November 7, 1986) upgraded rotorcraft certification and operational requirements, thus effecting amendments to several FARs. This amendment took effect on January 6, 1987. Current § 91.2 was amended to afford small helicopter operators the opportunity to apply for Category II instrument approach authorization. Proposed § 91.193 has been revised accordingly. Current § 91.23 was amended to reduce the IFR reserve fuel requirement for helicopters from 45 to 30 minutes. Proposed § 91.167 has been amended to reflect this change. Current § 91.116 (proposed § 91.175) was amended to establish a separate takeoff minimum for helicopters under IFR, of one-half mile visibility. Current § 91.171 was amended to include helicopters in the altimeter system and altitude reporting equipment tests and inspection requirements. Proposed § 91.411 has been amended to reflect this change. In order to enable rotorcraft to perform Category II operations, Amendment No. 91-196 also amended Appendix A in Part 91 by removing the word "airplane" and replacing it with the word "aircraft" wherever it appears.

Amendment No. 91-197 (52 FR 1836; January 15, 1987) revises the authority citation for Part 91 and adds a new paragraph to current § 91.213 which states that a commuter category airplane must have a pilot designated as second in command, unless the airplane has a passenger seating configuration, excluding pilot seats, of nine or less seats, and is type certificated for operations with one pilot. This amendment took effect on February 17, 1987. This rule now appears as § 91.531(a)(3).

Amendment No. 91-198, (52 FR 3391; February 3, 1987) amended current § 91.24(a) and (b) on ATC transponder and altitude reporting equipment and use. This amendment took effect on April 6, 1987. Subsequently, Amendment No. 91-203 (53 FR 23374; June 21, 1988) amended § 91.24(b) and (c) and Amendment No. 91-210 (54 FR 25682; June 16, 1989) revised § 91.24(a).

Proposed § 91.215 has been revised accordingly. Amendment No. 91-198 also revised paragraph (b)(2)(iii) of current § 91.90 to allow operations conducted prior to December 1, 1987, in Group II TCAs, to be exempt from the new equipment requirements of current § 91.24. Amendment No. 91-203 (53 FR 23374; June 21, 1988) subsequently revised § 91.90, effective July 21, 1988. Amendment No. 91-205 (53 FR 40323; October 14, 1988) further revised § 91.90 in its entirety effective January 12, 1989. Amendment No. 90-209 (54 FR 24883; June 9, 1989) amended § 91.90 by delaying the effective date of the section for helicopter operations. The rule, covering all amendments to date, appears in this revision as § 91.131.

Amendment No. 91-199, (52 FR 9636; March 25, 1987) amended current § 91.35 by renumbering the paragraphs and adding a new paragraph that requires any operator who has installed approved flight recorders and approved cockpit voice recorders to keep the recorded information for at least 60 days, or longer, if requested by the Administrator or the National Transportation Safety Board. This amendment took effect on May 26, 1987. The amended rule now appears as § 91.609.

Amendment No. 91-200, (52 FR 17277; May 6, 1987) amended current § 91.173 by requiring each registered aircraft owner or operator to keep "preventive maintenance" records as well as maintenance, alteration, and records of the 100-hour annual, progressive, and other required or approved inspections, as appropriate, for each engine, propeller, rotor, and appliance of an aircraft. This amendment took effect on June 5, 1987. This amended rule now appears as § 91.417(a)(1).

Amendment No. 91-201, (52 FR 20028; May 26, 1987) adds the reference to Part 129 to the exception in current § 91.161(b) from the requirements of §§ 91.165, 91.169, 91.171, 91.173, and 91.174 for aircraft maintained in accordance with a continuous maintenance program as provided for in Part 129. The amendment took effect on August 25, 1987. This amended rule now appears as § 91.401(b).

Amendment No. 91-202, (52 FR 34102; September 9, 1987 and 52 FR 35234; September 18, 1987) amended current § 91.27 on civil aircraft certification requirements by adding a new paragraph (c) to require that a copy of the form which authorized the alteration of an aircraft with fuel tanks within the passenger or a baggage compartment be kept on board the modified aircraft. This new rule now appears as § 91.203(c). Current § 91.173 on maintenance records was revised by requiring that such records be made available to the Administrator or an authorized representative of the National Transportation Safety Board and when such a fuel tank is installed as set forth in § 91.35 as amended pursuant to Part 43, a copy of the FAA Form 337 be kept on board the modified aircraft. This new rule appears as § 91.417(b) and (c). This amendment took effect on December 8, 1987.

Amendment No. 91-203, (53 FR 23374; June 21, 1988, 53 FR 25050; July 1, 1988, and 53 FR 26592; July 14, 1988) amended or revised § 91.24 (ATC transponder and altitude reporting equipment and use), 91.88 (Airport radar service areas), and 91.90 (Terminal control areas), and by adding a new Appendix D entitled "Airports/Locations Where the Transponder Requirements of § 91.24(b)(5)(ii) Apply," regarding use of transponders with automatic altitude reporting. This amendment took effect on July 21, 1988. Amendment No. 91-205 (53 FR 40323; October 14, 1988) revised § 91.90 in its entirety effective January 12, 1989. Amendment No. 91-209 (54 FR 24883; June 9, 1989) amended § 91.90 by delaying the effective date of the section for helicopter operations. These rules now appear in this revision as §§ 91.215, 91.130, 91.131, and new Appendix D to Part 91, respectively.

Amendment No. 91-204, (53 FR 26145; July 11, 1988) amended current § 91.35 on flight recorders and cockpit voice recorders to require digital flight recorders and voice recorders to be installed on selected aircraft operated in general aviation. The specifications for such recorders are set forth in a new Appendix E to Part 91 for airplanes and in a new Appendix F to Part 91 for helicopters. The amendment is reflected as § 91.609(b), (c), (d), and (e), and new Appendixes E and F to Part 91. This amendment becomes effective on October 11, 1991.

Amendment No. 91-205 (53 FR 40323; October 14, 1988) revised the classification and pilot and equipment requirements for conducting operations in terminal control areas (TCA's) by amending § 91.90 to establish a single-class TCA; require the pilot-in-command of a civil aircraft to hold at least a private pilot certificate, except for a student pilot who has received certain documented training; and, to eliminate the helicopter exception from the minimum equipment requirement. The amendment was effective on January 12, 1989. Subsequently, Amendment No. 91-209 (54 FR 24883; June 9, 1989) amended § 91.90(c)(1) by delaying the application of the section for helicopter operations for one year. Revised § 91.131 covers these amendments.

Amendment No. 91-206 (53 FR 50195; December 13, 1988) amended § 91.30 to permit rotorcraft, nonturbine-powered airplanes, gliders, and lighter-than-air aircraft, for which an approved Master Minimum Equipment List has not been developed, to be operated with inoperative instruments and equipment not essential for the safe operation of the aircraft. The amendment also permits general aviation operators of small rotorcraft, nonturbine-powered small airplanes, gliders, and lighter-than-air aircraft for which a Master Minimum Equipment List has been developed, the option of operating under the minimum equipment list concept, or under other conditions as set forth in the amendment. Amendment No. 91-206 also amended § 91.165 to require that any inoperative instrument or item of equipment permitted to be inoperative under the new amended § 91.30 to be repaired, replaced, removed, or inspected at the next required inspection for the aircraft. These amendments became effective on December 13, 1988, and appear as §§ 91.213 and 91.405 of this revision to Part 91.

Amendment No. 91-207 (54 FR 265; January 4, 1989) amended §§ 91.1 and 91.61 to extend the controlled airspace and the applicability of certain air traffic rules to coincide with presidential action to extend the territorial sea of the United States for international purposes, from 3 to 12 nautical miles from the U.S. coast. This amendment became effective on December 27, 1988. These amended rules now appear as §§ 91.1 and 91.101.

Amendment No. 91-208 (54 FR 950; January 10, 1989) added a new § 91.26 to require that any traffic alert and collision avoidance system installed in a U.S. registered civil aircraft must be approved by the Administrator, and if installed, must be on and operating during the aircraft's operation. The amendment became effective on February 9, 1989. The amendment appears herein as §§ 91.221.

Amendment No. 91-209 (54 FR 24883; June 9, 1989) delays the effective date of certain navigational equipment requirements of helicopter operations in a Terminal Control Area (TCA) by the amendment of § 91.90(c)(1). The amendment became effective on June 6, 1989. Section 91.131 covers this amendment.

Amendment No. 91-210 (54 FR 25682; June 16, 1989), effective June 16, 1989, amended § 91.24(a) to allow certain aircraft operators to install non-Mode S transponders in aircraft until July 1, 1992, instead of until January 1, 1992, provided that such transponders are manufactured prior to January 1, 1991, instead of prior to January 1, 1990. This amendment appears as § 91.215(a).

References to Part 91 found in other sections of the Federal Aviation Regulations have also been amended to incorporate the revised numbering of Part 91. These miscellaneous amendments are found at the end of the amendments to Part 91.

Furthermore, §§ 91.615 through 91.645 as identified in Notice No. 79-2C (50 FR 11292; March 20, 1985) now appear in this final rule as §§ 91.503 through 91.533.

Regulatory Evaluation

FAA analysis indicates that these amendments will not have a significant impact on the public or any level of government on an annual basis. The final rule includes changes to clarify the existing rules by simplifying the language, deleting obsolete requirements, consolidating similar regulations, updating equipment requirements to reflect the state-of-the-art, and relaxing certain operating and flight rule requirements.

Benefits

Section 91.117 allows reciprocating-powered aircraft to be operated in an airport traffic area at indicated airspeeds not greater than 200 knots. The FAA is unable to determine operator time and fuel cost savings because they will largely depend on the type of aircraft involved, desired speed, and weather and traffic conditions. The aggregate annual cost savings to these operators will not be significant because: 1) the normal cruise speed for most single engine reciprocating-powered aircraft does not exceed 156 knots, and 2) pilots of most multiengine reciprocating-powered aircraft, while operating within an airport traffic area, will not exceed the normal aircraft cruising speed which is not significantly greater than 156 knots in many of these aircraft.

Section 91.135 provides for a 2-day advance oral notification for submitting requests for authorizations to deviate from positive control area and route segment requirements. The old rule required a 4-day advance written notification of the proposed operation to ATC. A request for an authorization to deviate from these requirements is an infrequent occurrence. Consequently, the new rule will have minor benefits in terms of cost savings.

Sections 91.205, 91.509, and 91.511 clarify the definition of "shore" as that area of land adjacent to the water which is above the high water mark, thereby excluding tidal flats. From a safety standpoint, a tidal area covered with water is not as safe an emergency landing place as a dry shoreline. The main benefit is improved survivability from accidents in areas where for-hire operators may not be in compliance with the intent of the present rule. There is insufficient information in accident records to be able to estimate how many deaths could have been avoided through the use of life jackets and pyrotechnic signaling devices in these instances.

Costs

Any cost associated with defining "shore" in § 91.205 as the high water line is expected to be negligible. The only parties potentially affected are small for-hire operators who do not comply with the obvious intention of the rule as presently worded. The FAA believes these operators are very few (probably less than 20 operators) in number. Such operators are likely to be traversing tidal flats in areas like Alaska. If such operators do not comply with the rule as written now, then the cost of compliance would be a maximum of about $105 per year per aircraft. This assumes a $50 cost for an approved flotation device per seat and a flotation device useful life of 5 years ($10 per passenger seat per year), 10 seats per aircraft for these specific operators, plus $5 per year per aircraft for a pyrotechnic signaling device.

Section 91.409 allows operators of turbine-powered rotorcraft to use alternate inspection programs such as inspections under an FAA-approved continuous airworthiness maintenance program. The operators may now schedule inspections in a manner that allows the highest level of utilization of their rotorcraft.

The FAA estimates that in 1984 there were approximately 3,000 active turbine-powered rotorcraft in non-air taxi use. The FAA assumes that about one-half of the operators of these aircraft would use the new inspection options.

The value of using these options is difficult to estimate. At a minimum, the major effect of this proposed rule would be one additional day per year of rotorcraft utility. The usefulness of this can be set at least at the cost of capital for 1 day. Using an average aircraft value of $300,000 and a use of 250 days per year, the cost of capital can be estimated at $180 per day ($300,000 at 15 percent interest divided by 250 days). Thus, the minimum benefit is approximately $0.27 million per year (half the fleet, 1500 turbine-powered rotorcraft times $180). As the fleet grows, the value of this benefit also increases.

Because of the reorganization and resulting renumbering of provisions, persons who regularly refer to existing Part 91 must familiarize themselves with the new structure. It is also recognized that many non-regulatory materials containing references to present Part 91 sections may have to be modified. To assist in reference to the new provisions, a redesignation table, similar to the cross-reference table published herein, will be included in subsequent editions of the Code of Federal Regulations. The FAA believes that any short-term costs associated with transition to the reorganized Part 91 will be outweighed by the benefits inherent in a more logically organized set of regulations.

Trade Impact

The FAA has determined that this regulation will have no impact on international trade.

Regulatory Flexibility Determination

The Regulatory Flexibility Act (RFA) of 1980 was enacted by Congress in order to insure, among other things, that small entities are not disproportionately affected by Government regulations. The RFA requires agencies to review rules which may have a "significant economic impact on a substantial number of small entities." As discussed above, the regulatory evaluation for Part 91 indicates that there are no negative or significant economic impacts associated with the proposed rule.

All but four of the changes to Part 91 are editorial or clarifying changes. Three of the four changes result only in minimal benefits being applied. The other is a change to § 91.205 which, while it is basically clarifying, may involve some minimal cost and benefit. Any economic impact would be minor— approximately $100 per aircraft per year, and would affect only a few small for-hire operators

in Alaska who do not comply with the intent of the rule as presently worded. Thus, the change could not be construed to cause "significant economic impact on a substantial number" of small entities within the meaning of the RFA. Therefore, this rule will not have a significant economic impact on a substantial number of small entities.

Conclusion

The FAA has determined that this document is not considered major under Executive Order 12291 or significant under Department of Transportation Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). It causes only four minor changes, three of which will provide benefits with no additional costs to the aviation public. The fourth will impose negligible costs which are substantially outweighed by the benefits provided. Other amendments provide general benefits by deleting obsolete requirements, relaxing certain operating and flight rule requirements, and updating and clarifying the text. Under the provisions of Executive Order 12291, the amendments in this final rule will not have a major economic effect on consumers; industries; Federal, State, or local government agencies; or geographic regions. There will be no significant effects on competition, employment, investment, productivity, innovations, or the ability of U.S.-based enterprises to compete with foreign-based enterprises in domestic or import markets. It is certified that under the criteria of the Regulatory Flexibility Act this final rule will not have a significant economic impact on a substantial number of small entities. A copy of the full economic evaluation is filed in the public docket and may be obtained by contacting the person listed in the "FOR FURTHER INFORMATION CONTACT" paragraph of this document.

CROSS REFERENCE

To identify where present regulations are relocated in the new rule, the following cross-reference lists are provided:

Cross Reference Table

Old Section	*New Section*	*Old Section*	*New Section*
91.1	91.1 and 91.703	91.30	91.213
91.2	91.193	91.31	91.9
91.3	91.3	91.32	91.211
91.4	91.5	91.33	91.205
91.5	91.103	91.34	91.191
91.6	91.189	91.35	91.609
91.7	91.105	91.36	91.217
91.8	91.11	91.37	91.605
91.9	91.13	91.38	91.323
91.10	91.13	91.39	91.313
91.11	91.17	91.40	91.315
91.12	91.19	91.41	91.317
91.13	91.15	91.42	91.319
91.14	91.107	91.43	91.711
91.15	91.307	91.45	91.611
91.17	91.309	91.47	91.607
91.18	91.311	91.49	91.603
91.19	91.21	91.50	Deleted
91.20	91.705	91.51	91.219
91.21	91.109	91.52	91.207
91.22	91.151	91.53	Deleted
91.23	91.167	91.54	91.23
91.24	91.215	91.55	91.817
91.25	91.171	91.56	91.815
91.26	91.221	91.57	91.25
91.27	91.203	91.58	91.613
91.28	91.715	91.59	91.321
91.29	91.7	91.61	91.101

Old Section	*New Section*
91.63	91.903
91.65	91.111 and 91.123
91.67	91.113
91.69	91.115
91.70	91.117
91.71	91.303
91.73	91.209
91.75	91.123
91.77	91.125
91.79	91.119
91.81	91.121
91.83	91.153 and 91.169
91.84	91.707
91.85	91.127
91.87	91.129
91.88	91.130
91.89	91.127
91.90	91.131
91.91	91.137
91.93	91.305
91.95	91.133
91.97	91.135
91.100	91.139
91.101	91.709
91.102	91.143
91.103	91.713
91.104	91.141
91.105	91.155
91.107	91.157
91.109	91.159
91.115	91.173
91.116	91.175
91.117	Deleted
91.119	91.177
91.121	91.179
91.123	91.181
91.125	91.183
91.127	91.185
91.129	91.187
91.161	91.401
91.163	91.403
91.165	91.405
91.167	91.407
91.169	91.409
91.170	91.415
91.171	91.411
91.172	91.413
91.173	91.417
91.174	91.419
91.175	91.421
91.181	91.501
91.183	91.503
91.185	91.505
91.187	91.507
91.189	91.509
91.191	91.511
91.193	91.513
91.195	91.515
91.197	91.517
91.199	91.519
91.200	91.521
91.201	91.523
91.203	91.525
91.205	Deleted
91.207	Deleted
91.209	91.527
91.211	91.529
91.213	91.531
91.215	91.533
91.301	91.801
91.302	91.803
91.303	91.805
91.305	91.807
91.306	91.809
91.307	91.811
91.308	91.813
91.309	91.819
91.311	91.821
Appendix A	Appendix A
Appendix B	Appendix B
Appendix C	Appendix C
Appendix D	Appendix D
Appendix E	Appendix E
Appendix F	Appendix F

Cross Reference Table

New Section	*Old Section*
91.1	91.1
91.3	91.3
91.5	91.4
91.7	91.29
91.9	91.31
91.11	91.8
91.13	91.9 and 91.10
91.15	91.13
91.17	91.11
91.19	91.12
91.21	91.19
91.23	91.54
91.25	91.57
91.101	91.61
91.103	91.5
91.105	91.7
91.107	91.14
91.109	91.21
91.111	91.65
91.113	91.67
91.115	91.69
91.117	91.70
91.119	91.79
91.121	91.81
91.123	91.75 and 91.65
91.125	91.77

Cross Reference Table—Continued

New Section	*Old Section*
91.127	91.85 and 91.89
91.129	91.87
91.130	91.88
91.131	91.90
91.133	91.95
91.135	91.97
91.137	91.91
91.139	91.100
91.141	91.104
91.143	91.102
91.151	91.22
91.153	91.83
91.155	91.105
91.157	91.107
91.159	91.109
91.167	91.23
91.169	91.83
91.171	91.25
91.173	91.115
91.175	91.116
91.177	91.119
91.179	91.121
91.181	91.123
91.183	91.125
91.185	91.127
91.187	91.129
91.189	91.6
91.191	91.34
91.193	91.2
91.201	New
91.203	91.27
91.205	91.33
91.207	91.52
91.209	91.73
91.211	91.32
91.213	91.30
91.215	91.24
91.217	91.36
91.219	91.51
91.221	91.26
91.301	New
91.303	91.71
91.305	91.93
91.307	91.15
91.309	91.17
91.311	91.18
91.313	91.39
91.315	91.40
91.317	91.41
91.319	91.42
91.321	91.59
91.323	91.38
91.401	91.161
91.403	91.163
91.405	91.165
91.407	91.167
91.409	91.169
91.411	91.171
91.413	91.172
91.415	91.170
91.417	91.173
91.419	91.174
91.421	91.175
91.501	91.181
91.503	91.183
91.505	91.185
91.507	91.187
91.509	91.189
91.511	91.191
91.513	91.193
91.515	91.195
91.517	91.197
91.519	91.199
91.521	91.200
91.523	91.201
91.525	91.203
91.527	91.209
91.529	91.211
91.531	91.213
91.533	91.215
91.601	New
91.603	91.49
91.605	91.37
91.607	91.47
91.609	91.35
91.611	91.45
91.613	91.58
91.701	New
91.703	91.1
91.705	91.20
91.707	91.84
91.709	91.101
91.711	91.43
91.713	91.103
91.715	91.28
91.801	91.301
91.803	91.302
91.805	91.303
91.807	91.305
91.809	91.306
91.811	91.307
91.813	91.308
91.815	91.56
91.817	91.55
91.819	91.309
91.821	91.311
91.901	New
91.903	91.63
91.905	New
Appendix A	Appendix A
Appendix B	Appendix B
Appendix C	Appendix C
Appendix D	Appendix D
Appendix E	Appendix E
Appendix F	Appendix F

Newly Established Rules

91.201	91.701
91.301	91.901
91.601	91.905

THE RULE

For the reasons set forth above, Part 91 of the Federal Aviation Regulations (14 CFR Part 91) is revised and Parts 1, 21, 23, 25, 27, 31, 33, 35, 36, 43, 45, 47, 61, 63, 65, 71, 93, 99, 103, 121, 125, 127, 133, 135, 137, and 141 of the Federal Aviation Regulations (14 CFR Parts 1, 21, 23, 25, 27, 31, 33, 35, 36, 43, 45, 47, 61, 63, 65, 71, 93, 99, 103, 121, 125, 127, 133, 135, 137, and 141) are amended effective August 18, 1990.

The authority citation for Part 43 continues to read as follows:

Authority: 49 U.S.C. 1354, 1421 through 1430; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983).

Amendment 43-32

Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered Airplanes

Adopted: July 26, 1990 **Effective: September 10, 1990**

(Published in 55 FR 32856, August 10, 1990)

SUMMARY: This final rule codifies as new Part 34 all of the applicable aircraft engine fuel venting and exhaust emission requirements of Special Federal Aviation Regulation (SFAR) 27-5, and the test procedures specified under the regulations implementing the Clean Air Act. This rule consolidates all of the requirements and test procedures into this part, and inserts into other affected parts the requirements to comply with new Part 34. New Part 34 does not alter any of the requirements specified under SFAR 27-5 or the regulations implementing the Clean Air Act.

EFFECTIVE DATE: This regulation is effective September 10, 1990. The incorporation by reference of certain publications listed in the regulations was previously approved by the Director of the Federal Register on November 22, 1983 (48 FR 56740, December 23, 1983).

FOR FURTHER INFORMATION CONTACT: Harvey Van Wyen, Research and Engineering Branch (AEE-110), Office of Environment and Energy, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591; Telephone: (202) 267-3558.

SUPPLEMENTARY INFORMATION:

This rule replaces SFAR 27-5 with a new Federal Aviation Regulation Part 34 as authorized by Section 232 of the Clean Air Act, as amended (42 U.S.C. 7401) (the Act) and by the authority delegated to the Administrator of the FAA by the Secretary of Transportation. This rule also amends references to SFAR 27-5 in other parts of the FARs (Parts 11, 21, 43, 45, and 91). References to new Part 34 will be added to Parts 23, 25, and 33 of the FARs. This codification of SFAR 27-5 and 40 CFR Part 87 is based on Notice No. 88-9 (53 FR 18530, May 23, 1988). Comments were invited. All comments received have been considered in the issuance of this final rule.

SYNOPSIS OF THE PROPOSAL

Overview

When the Environmental Protection Agency (EPA) originally issued 40 CFR Part 87, Control of Air Pollution from Aircraft and Aircraft Engines; Emission Standards and Test Procedures in 1973, it was recognized that some portions of the standards could be implemented in a very short time period while other portions would require a much longer time period for development and testing. In accordance with Section 232 of the Clean Air Act, as amended (42 U.S.C. 7401), the FAA proceeded to promulgate compliance regulations for the near-term requirements in the form of a Special Federal Aviation Regulation, SFAR 27-5. Subsequent to the original issuance of 40 CFR Part 87, the EPA has recognized that some of the longer-term requirements were either unneeded or practically unattainable. Those longer-term requirements, originally scheduled to become effective in 1978, have been extensively revised by the EPA. Revised 40 CFR Part 87 now contains all current aircraft and aircraft engine emission standards. Under the requirement of Section 232 of the Clean Air Act Amendments of 1970, the FAA has promulgated, in SFAR 27-5, compliance regulations for all of the standards in 40 CFR Part 87.

By this rulemaking, the FAA will continue to comply with Section 232 of the Clean Air Act Amendments of 1970 by establishing a new Part 34 to 14 CFR containing all of the compliance regulations for fuel venting and engine exhaust emissions. This rule also revises other affected parts to require compliance with Part 34. Since SFAR 27-5 and its amendments were issued, they have, by definition, been considered temporary, and their exact status has been confusing to the parties directly or indirectly affected by the regulations. The other parts directly affected by SFAR 27-5 have heretofore referenced only SFAR 27-5 and the reader has been required to review SFAR 27-5 in its entirety in

order to determine its effect on other parts. The FAA, with this final rule, codifies the compliance regulations in a single part of the Federal Aviation Regulations, and revises the other affected parts accordingly.

The provisions of 40 CFR Part 87 are applicable to each individual aircraft gas turbine engine of the classes, and as of dates, specified in that part. Compliance would require exhaust emission testing of each individual engine that is subject to the requirements of 40 CFR Part 87. The EPA has recognized in the preamble to 40 CFR Part 87, and specifically in § 87.89, that testing each individual engine would be excessively costly.

The EPA concluded that it was necessary to develop a practical interpretation of the requirement for demonstrated compliance by each individual engine and to substitute a preproduction certification program as a compliance procedure in place of compliance testing. The promulgation of such a preproduction certification compliance program has been delegated to the FAA subject to the concurrence of the Administrator of the EPA. The FAA consulted extensively with the EPA on this matter. The EPA concluded that an acceptable preproduction certification compliance program must demonstrate that, at minimum, with 90 percent confidence, 95 percent of the engines would meet the gaseous emission standards, and with 90 percent confidence, every engine would meet the smoke standards. The International Civil Aviation Organization (ICAO), in its Standards and Recommended Practices for Aircraft Engine Emissions, adopted a similar preproduction certification compliance procedure based upon a composite of historical engine-to-engine variability. Since the EPA stressed the desirability of commonality with ICAO, the FAA, with the concurrence of the EPA, adopted the compliance procedure defined in Appendix 6 to ICAO Annex 16, Volume II—Aircraft Engine Emissions, First Edition, June 1981.

The FAA solicited comments and recommendations concerning equivalent procedures in a Notice of Proposed Rulemaking (53 FR 18530, May 23, 1988). No comments were received on the equivalent procedures issue. The FAA will give any future recommendation full consideration if it is accompanied by substantive supporting data demonstrating equivalency. Should an acceptable equivalent procedure be proposed, the FAA will seek EPA concurrence with that proposed equivalent procedure as an alternative compliance procedure. The FAA cannot, however, adopt any proposed compliance procedure unless it has the concurrence of the Administrator of the EPA.

Regulatory History

Under Section 232 of the Clean Air Amendments of 1970, Pub. L. 91-604, the FAA is required to issue regulations that ensure compliance with all aircraft emission standards promulgated under Section 231 of the Act, which are currently prescribed in 40 CFR Part 87 originally issued on July 6, 1973 (38 FR 19088, July 17, 1973). Accordingly, on December 26, 1973, the FAA issued SFAR 27, (38 FR 35427, December 28, 1973). The purpose of SFAR 27 was to ensure compliance with the aircraft and aircraft engine emission standards and test procedures issued by the EPA in 40 CFR Part 87.

SFAR 27, as originally issued, required compliance only with those standards and procedures in 40 CFR Part 87 that were effective beginning February l, 1974. Since its issuance, SFAR 27 has been amended seven times by the FAA. On December 23, 1974, the FAA issued SFAR 27-1 (39 FR 45008, December 30, 1974) to require compliance with the fuel venting emission standards in 40 CFR Part 87 that became effective January 1, 1975. SFAR 27-2, effective January 1, 1976 (40 FR 55311, November 28, 1975), required compliance with smoke emissions standards in 40 CFR Part 87 applicable to new and in-use aircraft turbofan or turbojet engines with a rated power of 29,000 pounds thrust or greater that are designed for operation on subsonic airplanes. SFAR 27-3 (42 FR 64876, December 29, 1977) required compliance with smoke emission standards in 40 CFR Part 87 for JT3D engines manufactured on and after January 1, 1978. A fourth amendment, SFAR 27-4 (45 FR 71960, October 30, 1980), was issued to require phased compliance with smoke emission standards by in-use JT3D engines beginning on January 1, 1981, with total compliance required by January 1, 1985. Subsequently, the requirement for compliance by in-use JT3D engines was automatically deleted under the terms of SFAR 27, §3(b), when the EPA deleted the underlying requirement from 40 CFR Part 87 (48 FR 2716, January 20, 1983).

On December 21, 1982, the EPA revised 40 CFR Part 87 and republished the rule in its entirety (47 FR 58462, December 30, 1982). The revised rule contained a number of changes in definitions as well as new standards for smoke and unburned hydrocarbon emissions. The FAA is required by

40 CFR Section 87.89 to establish and approve a testing program to assure compliance with Part 87 by January 1, 1984. On December 8, 1983, the FAA issued amended SFAR 27-5 (48 FR 56735, December 23, 1983) which required compliance with all of the provisions of revised 40 CFR Part 87 and contained an EPA-approved testing program. The effective date of SFAR 27-5 was January 1, 1984. On October 4, 1983, the EPA issued a stay of the January 1, 1984, effective date for EPA's smoke standards, applicable to aircraft turbine engines rated below 26.7 kilonewtons (kN) (6000 pounds) thrust in response to a petition by the General Aviation Manufacturers Association (GAMA) (48 FR 46481, October 12, 1983). On July 30, 1984, the EPA denied the GAMA petition and established an August 9, 1985, effective date for smoke standards applicable to aircraft turbine engines rated below 26.7 kN (49 FR 31873, August 9, 1984). On October 9, 1984, the EPA changed the definition of "very low production" engines in the provisions for exemptions and revised the exhaust emission test fuel specification (49 FR 41000, October 18, 1984). On March 18, 1986, the FAA amended SFAR 27-5 to correct the authority citations for petitions for exemptions to SFAR 27-5 (51 FR 10612, March 28, 1986). On September 15, 1989, the FAA amended SFAR 27-5 to reflect delegations of authority that were affected by a recent agencywide reorganization (54 FR 39288, September 25, 1989).

Discussion of Comments

A total of seven written responses containing comments were received by the FAA subsequent to the publication of Notice 88-9. All of the comments submitted to the docket have been reviewed. The proposed amendments to Parts 11, 21, 23, 25, 33, 45 and 91 and the new Part 34 have been revised to reflect those relevant comments and suggestions within the scope of Notice 88-9.

Many of the comments regarding technical amendments to Parts 11, 21, 23, 25, 33, 45 and 91 were found to be of sufficient merit to warrant revisions to the final rule. Those comments recommending substantive changes to Part 34 were not adopted, since Part 34 is restricted to the direct implementation of 40 CFR Part 87 which was promulgated by the EPA. The substantive portion of Part 34 is intended to be essentially a word-for-word reproduction of the substantive portions of 40 CFR Part 87. Future comments regarding the substantive aspects of 40 CFR Part 87 should be addressed to the EPA.

Comments pertaining to amending Parts 11, 21, 23, 25, 33, 45 and 91:

One commenter noted that the proposed change in § 23.903(a)(1) and a similar change in § 25.903(a)(1) were inconsistent with a previous broad revision for all categories of aircraft which introduced a common requirement with the words "Each engine must have a type certificate." The commenter noted that the wording as stated in the NPRM would exclude engines certificated on the basis of Civil Air Regulation 13 (the predecessor to the present FAR Part 33) and all engines certificated under the provisions of § 21.29. The commenter's proposed wording also addresses another commenter's concern that the requirement for the certification of each engine under Part 34 should be restated to emphasize that the requirement is in effect only when Part 34 is applicable to that particular engine. The wording proposed by the commenter was adopted for §§ 23.903(a)(1) and 25.903(a)(1) of the final rule.

Regarding the proposed changes to § 23.951(d) and 25.951(d), two commenters noted that the requirements of Parts 23 and 25 apply to the airplane, not the engines. The proposed change offered by one of the commenters was adopted in the final rule by changing the phrase "Each fuel system for a turbine engine must. . ." to the phrase "Each fuel system for a turbine engine powered airplane must. . .".

One commenter noted that although the NPRM proposed to amend 14 CFR Parts 11, 21, 23, 45 and 91 and add a new Part 34, there was no corresponding change proposed for Part 33 requiring the applicant for a certification under Part 21 to show compliance with the applicable requirements of Part 34. The FAA concurs with the comment and has added an appropriate revision to Part 33 in the final rule.

One commenter noted that the proposed wording in the NPRM for § 45.13(a)(7) and 45.13(a)(7)(i) is inconsistent with the current practice that engines that do not have gaseous or exhaust smoke emission standards imposed by 40 CFR Part 87, namely turboprop (Class TP) engines of less than 1000 kW rated power, do not need to indicate any information on emissions on their identification plates. The commenter recommended adding the words "exhaust emissions" to the first sentence in § 45.13(a)(7) as follows: ". . . indicates compliance with the applicable exhaust emissions provisions of Part 34 . . .". A similar change was recommended for § 45.13(a)(7)(i). These minor clarifications were adopted by

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the FAA in the final rule. The same commenter also suggested that the requirements for a "permanent powerplant record" under § 45.13(a)(7)(i) and (ii) be changed to "engine logbook". The suggestion was not adopted in the final rule. The FAA does not have a requirement for an "engine logbook" nor could the FAA determine that "engine logbook" was an industry standard or custom. Therefore, the generic term "permanent powerplant record" was kept in the final rule.

One commenter suggested that as a matter of practical convenience the proposed requirement for 14 CFR Section 91.27(d) commence as follows: [14 CFR 91 will be completely revised as of August 18, 1990 (see 54 FR 34284, August 18, 1989) to renumber all of its sections. Section 91.27 will be renumbered as § 91.203 and § 91.28 will be renumbered as § 91.715. Hereafter in this preamble, references to the renumbered Part 91 will be shown in brackets.] "Except as provided in § 91.28 [91.715], no person . . .", and that §91. 28 [91.715] be amended to reflect the exhaust emission exemption of 40 CFR Section 87.7, as is currently provided for certificates of airworthiness in § 91.28(a) [91.715(a)]. The recommendation was not adopted in the final rule. Part 87 allows for an exemption for airplanes that do not comply with emission standards when operated on flights of short duration or at infrequent intervals. These exemptions from emission compliance are not as broad as those exemptions allowed for airworthiness under § 91.28 [91.715]. Part 34 does and must reflect the requirements of 40 CFR Section 87.7.

Comments pertaining to the new Part 34:

Based on the comments received, a definition for "reference day conditions" was added to § 34.1, and § 34.1 definitions for "date of manufacture," "aircraft," and "Administrator" were amended for clarity or to conform with an existing definition of the term in use in the FARs.

Several of the comments pertained to typographical errors in the NPRM and the inclusion of additional terms in the abbreviations table in § 34.2. The commenters' recommended changes were adopted in the final rule.

Regarding the proposed § 34.60(b), a commenter suggested that the requirement to use a dynamometer for engines producing shaft power is unduly restrictive. The commenter stated that acceptance testing of most new turboprop engines is done using a propeller with either a calibrated test-stand torquemeter or the engine's integral torque measuring device. The commenter concluded that if these devices are acceptable to the FAA for determining an engine's power output they should be equally acceptable for the Part 34 tests. The comment was not adopted in the final rule. The requirement for the dynamometer was established by the EPA in 40 CFR 87.60(b). The FAA may, however, approve alternative test procedures under the provisions of § 34.3(a) or § 34.5 if proper applications are submitted. Part 34 reflects, and must continue to reflect, the requirements of 40 CFR Part 87.60(b).

One commenter indicated that the turbine fuel specifications contained in proposed § 34.61 are not consistent with the latest American Society for Testing Materials (ASTM) recommendations. In response, the FAA notes that the EPA initially adopted the turbine fuel specifications identical to those contained in Appendix 4 of Volume 2 of ICAO Annex 16. However, after much consideration, the EPA subsequently revised the fuel specifications (47 FR 58462, December 30, 1982). As required, 14 CFR Part 34 must directly adopt the revised EPA fuel specification (with the exception of a correction of a typographical error in the units of measure for kinematic viscosity). It should be noted that § 34.61 fuel specifications are more stringent than the fuel specifications in Appendix 4 of Volume 2 of ICAO Annex 16.

Section 34.7 states that all petitions for rulemaking involving either the substance of an emission standard or test procedure prescribed by the EPA, or a compliance date for such standard or procedure, must be submitted to the EPA. As stated in the NPRM (53 FR 18530, May 23, 1988), informational copies of such petitions are invited by the FAA. One commenter wrote that to invite rather than require is ambiguous and would set an undesirable precedent. The commenter concluded that if copies of the petition are not required, the provision to invite informational copies of the petition should be removed from the regulation. The commenter's suggestion has not been adopted in the final rule. The FAA feels that the invited information copies will expedite the required consultation process between the FAA and the EPA in order to determine if action on such petitions requires rulemaking under Sections 231 and 232 of the Clean Air Act, as amended.

One commenter was concerned that the fuel venting and exhaust emission requirements of Part 34 would be applied to auxiliary power unit (APU) installations through the requirements of Parts 23 and 25. The EPA proposed to withdraw emission control requirements from APU's in 1978 (43 FR 12615, March 24, 1978) and omitted APU emission control requirements from their final rule (47 FR 58462, December 30, 1982). Therefore, the FAA does not intend to impose Part 34 requirements on AFUs.

A commenter suggested that where engine power is expressed in kilonewton(s), the equivalent in pounds of thrust should also be shown. The suggestion has merit and was adopted in the final rule.

Several commenters suggested changes in the arrangement of Part 34 sections and deletion of certain wording as a means of simplifying Part 34 without affecting the content of 40 CFR Part 87. The suggestions were not adopted in the final rule. The FAA chose to incorporate, to the maximum extent possible, the substantive portions of 40 CFR Part 87 into 14 CFR Part 34 on a word-for-word and section-to-section basis in order to maintain consistency between the two bodies of rules.

One commenter requested assurance from the FAA that the new Part 34 would not place any new or additional regulatory burden on owners/operators of in-use JT3D engines manufactured before 1978. New Part 34 is intended to codify only the provisions of Special Federal Aviation Regulation (SFAR) 27-5, and the EPA standards and test procedures contained in 40 CFR Part 87. New Part 34 does not place any new or additional regulatory burden on owners/operators of any aircraft or aircraft engines; it merely recodifies the existing rules of SFAR 27 and 40 CFR Part 87. This includes in-use JT3D engines manufactured before 1978. There is no requirement in new Part 34 to retrofit in-use JT3D engines manufactured before 1978.

Paperwork Reduction Act

Information collection requirements contained in SFAR 27-5 were approved by the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1980 (Pub. L. 96-511) and was assigned OMB control number 2120-0508. That control number will be designated for Sections 34.7 and 45.13, as listed in Section 11.101(a).

Regulatory Evaluation

The FAA has reviewed the final rule establishing the new Part 34, "Fuel Venting and Exhaust Emission Requirements for Turbine Powered Airplanes," to determine what, if any, economic impact it will have on the aviation industry. The FAA concludes that Part 34 will not have a significant economic impact on the aviation industry and that it does not constitute a major rule pursuant to Executive Order 12291.

Section 232 of the Clean Air Act Amendments of 1970, Public Law 91-604, requires the FAA to issue regulations that ensure compliance with all aircraft emissions standards promulgated under Section 231 of the Clean Air Act, which are currently prescribed in 40 CFR Part 87. These standards and their applicability are clearly defined in 40 CFR Part 87, and the FAA has no option but to enforce them.

As part of the process of promulgating 40 CFR Part 87, the EPA conducted an economic analysis of the proposed regulations and determined that they would not constitute a major rule, as defined by Executive Order 12291 (47 FR 58469, December 30, 1982). This deterination was based on the expected economic impact being well below the $100 million per year threshold set forth in the Executive Order, and the expectation that the rules would not impose significantly increased costs or other adverse effects on competition, employment, investment, productivity, innovation, or the ability of U.S. enterprises to compete with those of other countries. The EPA's economic analysis containing this determination can be found in Public Docket Number OMSAPC-78-1, which may be examined at the Environmental Protection Agency, Central Docket Section, West Tower Lobby, Gallery I, 401 M Street, SW., Washington DC, 20406. A copy of the EPA's economic analysis has also been placed in Docket 25613 for the convenience of those interested in reviewing it. The FAA has reviewed and concurs with the findings in the EPA economic analysis.

Following the EPA's revision of 40 CFR 87, the FAA issued amended SFAR 27-5 (48 FR 56735, December 23, 1983), which required compliance with all of the provisions of 40 CFR Part 87. The SFAR was most recently amended on September 15, 1989 (54 FR 39288, September 25, 1989). The purpose

of Part 34 is to replace SFAR 27-5 as a permanent part in the FAR's and to continue the enforcement of 40 CFR Part 87, as required by the statute. This action does not in any way change, add to, or take away from the standards in 40 CFR Part 87 or the requirements for compliance currently implemented under SFAR 27-5. Part 34 will not impose any new or additional regulatory requirements. On May 23, 1988, the FAA issued a notice of proposed rulemaking indicating its intention to promulgate Part 34. This NPRM contained a regulatory evaluation asserting that no new or additional cost burdens would be imposed by the new regulation. No comments were submitted in Docket 25613 disputing this assertion. Therefore, the FAA is assured that no new or additional cost burden will result from the promulgation of this regulation.

Part 34 is easier to review and understand than SFAR 27-5. Thus, persons affected by 40 CFR Part 87 will be relieved from a burden and a slight, unquantifiable benefit will result from this action. Because this beneficial economic impact is considered minimal, the FAA determines that no further analysis is necessary. Accordingly, the FAA concludes that this rulemaking action will not have a significant economic impact on the aviation industry and that it does not constitute a major rule pursuant to Executive Order 12291.

International Trade Impact Analysis

Part 34 will neither eliminate any present regulation nor impose any new regulation. As a result, affected operators will not incur additional costs or significant costs savings. Thus, Part 34 will not have any impact on trade opportunities for either U.S. firms doing business overseas or foreign firms doing business in the United States.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 was enacted to ensure that small entities are not unnecessarily or disproportionately burdened by Government regulation. The Act requires a Regulatory Flexibility Analysis if a rule has a significant economic impact, either detrimental or beneficial, on a substantial number of small business entities. As noted above, Part 34 will neither eliminate any present regulations nor impose any new regulations and, thus, will not have a significant economic impact, either detrimental or beneficial, on affected operators. Consequently, the FAA determines that, under the criteria of the Regulatory Flexibility Act of 1980, a regulatory flexibility analysis is not required.

Environmental Analysis

Pursuant to Department of Transportation, "Policies and Procedures for Considering Environmental Impacts" (FAA Order 1050.1D, Appendix 7, paragraph 4, Change 3, December 5, 1986), the FAA is categorically excluded from providing an environmental analysis with regard to Part 34 because it is mandated by law to issue regulations to ensure compliance with the EPA aircraft emissions standards and the EPA has performed all required environmental analyses prior to the issuance of those standards.

Federalism Implications

The regulations adopted herein will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this final rule will not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

The FAA has determined that this document involves regulations which are not considered to be major under the procedures and criteria prescribed in Executive Order 12291. The rule is considered not significant under Department of Transportation Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). A copy of the evaluation prepared for this action is contained in the regulatory docket. A copy of the evaluation may be obtained from the person identified in the section entitled "FOR FURTHER INFORMATION CONTACT." For the reasons stated in the regulatory evaluation, I certify that these regulations, if promulgated, will not have a significant economic impact on a substantial number of small entities. In addition, these proposals, if adopted, would have little or no impact on trade opportunities for U.S. firms doing business overseas or for foreign firms doing business in the United States.

THE FINAL RULE

Accordingly, the FAA amends 14 CFR, Chapter I, by amending Parts 11, 21, 23, 25, 33, 43, 45, and 91, and adding a new Part 34 effective September 10, 1990.

The authority citation for Part 43 continues to read as follows:

Authority: 49 U.S.C. 1354, 1421 through 1430; 49 U.S.C. 106(g) (Revised Pub L. 97-449, January 12, 1983).

Part 43—Maintenance, Preventive Maintenance, Rebuilding, and Alteration

§ 43.1 Applicability.

(a) Except as provided in paragraph (b), this Part prescribes rules governing the maintenance, preventive maintenance, rebuilding, and alteration of any—

[(1) Aircraft having a U.S. airworthiness certificate;

[(2) Foreign-registered civil aircraft used in common carriage or carriage of mail under the provisions of Part 121, 127, or 135 of this chapter; and

[(3) Airframe, aircraft engines, propellers, appliances, and component parts of such aircraft.]

(b) This Part does not apply to any aircraft for which an experimental airworthiness certificate has been issued, unless a different kind of airworthiness certificate had previously been issued for that aircraft.

[§ 43.2 Records of overhaul and rebuilding.

[(a) No person may describe in any required maintenance entry or form an aircraft, airframe, aircraft engine, propeller, appliance, or component part as being overhauled unless—

[(1) Using methods, techniques, and practices acceptable to the Administrator, it has been disassembled, cleaned, inspected, repaired as necessary, and reassembled; and

[(2) It has been tested in accordance with approved standards and technical data, or in accordance with current standards and technical data acceptable to the Administrator, which have been developed and documented by the holder of the type certificate, supplemental type certificate, or a material, part, process, or appliance approval under § 21.305 of this chapter.

[(b) No person may describe in any required maintenance entry or form an aircraft, airframe, aircraft engine, propeller, appliance, or component part as being rebuilt unless it has been disassembled, cleaned, inspected, repaired as necessary, reassembled, and tested to the same tolerances and limits as a new item, using either new parts or used parts that either conform to new part tolerances and limits or to approved oversized or undersized dimensions.]

§ 43.3 Persons authorized to perform maintenance, preventive maintenance, rebuilding, and alterations.

[(a) Except as provided in this section and § 43.17, no person may maintain, rebuild, alter, or perform preventive maintenance on an aircraft, airframe, aircraft engine, propeller, appliance, or component part to which this Part applies.] Those items, the performance of which is a major alteration, a major repair, or preventive maintenance, are listed in Appendix A.

(b) The holder of a mechanic certificate may perform maintenance, preventive maintenance, and alterations as provided in Part 65.

(c) The holder of a repairman certificate may perform maintenance and preventive maintenance as provided in Part 65.

(d) A person working under the supervision of a holder of a mechanic or repairman certificate may perform the maintenance, preventive maintenance, and alterations that his supervisor is authorized to perform, if the supervisor personally observes the work being done to the extent necessary to ensure that it is being done properly and if the supervisor is readily available, in person, for consultation. [However, this paragraph does not authorize the performance of any inspection required by Part 91 or Part 125 of this chapter or any inspection performed after a major repair or alteration.]

(e) The holder of a repair station certificate may perform maintenance, preventive main-

tenance, and alterations as provided in Part 145.

(f) The holder of an air carrier operating certificate or an operating certificate issued under Part 121, 127, or 135, may perform maintenance, preventive maintenance, and alterations as provided in Part 121, 127, or 135.

(g) The holder of a pilot certificate issued under Part 61 may perform preventive maintenance on any aircraft owned or operated by that pilot which is not used under Part 121, 127, 129, or 135.

(h) Notwithstanding the provisions of paragraph (g) of this section, the Administrator may approve a certificate holder under Part 135 of this chapter, operating rotorcraft in a remote area, to allow a pilot to perform specific preventive maintenance items provided—

(1) The items of preventive maintenance are a result of a known or suspected mechanical difficulty or malfunction that occurred en route to or in a remote area;

(2) The pilot has satisfactorily completed an approved training program and is authorized in writing by the certificate holder for each item of preventive maintenance that the pilot is authorized to perform;

(3) There is no certificated mechanic available to perform preventive maintenance;

(4) The certificate holder has procedures to evaluate the accomplishment of a preventive maintenance item that requires a decision concerning the airworthiness of the rotorcraft; and

(5) The items of preventive maintenance authorized by this section are those listed in paragraph (c) of Appendix A of this part.

(i) A manufacturer may—

(1) Rebuild or alter any aircraft, aircraft engine, propeller, or appliance manufactured by him under a type or production certificate;

(2) Rebuild or alter any appliance or part of aircraft, aircraft engines, propellers, or appliances manufactured by him under a Technical Standard Order Authorization, an FAA-Parts Manufacturer Approval, or Product and Process Specification issued by the Administrator; and

(3) Perform any inspection required by Part 91 or Part 125 of this chapter on aircraft it manufactures, while currently operating under a production certificate or under a currently approved production inspection system for such aircraft.

§ 43.5 Approval for return to service after maintenance, preventive maintenance, rebuilding, or alteration.

No person may approve for return to service any aircraft, airframe, aircraft engine, propeller, or appliance, that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless—

(a) The maintenance record entry required by § 43.9 or § 43.11, as appropriate, has been made;

(b) The repair or alteration form authorized by or furnished by the Administrator has been executed in a manner prescribed by the Administrator; and

(c) If a repair or an alteration results in any change in the aircraft operating limitations or flight data contained in the approved aircraft flight manual, those operating limitations or flight data are appropriately revised and set forth as prescribed in [§ 91.9] of this chapter.

§ 43.7 Persons authorized to approve aircraft, airframes, aircraft engines, propellers, appliances, or component parts for return to service after maintenance, preventive maintenance, rebuilding, or alteration.

(a) Except as provided in this section and § 43.17, no person, other than the Administrator, may approve an aircraft, airframe, aircraft engine, propeller, appliance, or component part for return to service after it has undergone maintenance, preventive maintenance, rebuilding, or alteration.

(b) The holder of a mechanic certificate or an inspection authorization may approve an aircraft, airframe, aircraft engine, propeller, appliance, or component part for return to service as provided in Part 65 of this chapter.

(c) The holder of a repair station certificate may approve an aircraft, airframe, aircraft engine, propeller, appliance, or component part for return to service as provided in Part 145 of this chapter.

(d) A manufacturer may approve for return to service any aircraft, airframe, aircraft engine, propeller, appliance, or component part which that manufacturer has worked on under § 43.3(h). However, except for minor alterations, the work must have been done in accordance with technical data approved by the Administrator.

(e) The holder of an air carrier operating certificate or an operating certificate issued under Part 121, 127, or 135, may approve an aircraft, airframe, aircraft engine, propeller, appliance, or component part for return to service as provided in Part 121, 127, or 135 of this chapter, as applicable.

(f) A person holding at least a private pilot certificate may approve an aircraft for return to service after performing preventive maintenance under the provisions of § 43.3(g).

§ 43.9 Content, form, and disposition of maintenance, preventive maintenance, rebuilding, and alteration records (except inspections performed in accordance with Part 91, Part 123, Part 125, § 135.411(a)(1), and § 135.419 of this chapter).

(a) *Maintenance record entries.* Except as provided in paragraphs (b) and (c) of this section, each person who maintains, performs preventive maintenance, rebuilds, or alters an aircraft, airframe, aircraft engine, propeller, appliance, or component part shall make an entry in the maintenance record of that equipment containing the following information:

(1) A description (or reference to data acceptable to the Administrator) of work performed.

(2) The date of completion of the work performed.

(3) The name of the person performing the work if other than the person specified in paragraph (a)(4) of this section.

(4) If the work performed on the aircraft, airframe, aircraft engine, propeller, appliance, or component part has been performed satisfactorily, the signature, certificate number, and kind of certificate held by the person approving the work. The signature constitutes the approval for return to service only for the work performed.

In addition to the entry required by this paragraph, major repairs and major alterations shall be entered on a form, and the form disposed of, in the manner prescribed in Appendix B, by the person performing the work.

(b) Each holder of an air carrier operating certificate or an operating certificate issued under Part 121, 127, or 135, that is required by its approved operations specifications to provide for a continuous airworthiness maintenance program, shall make a record of the maintenance, preventive maintenance, rebuilding, and alteration, on aircraft, airframes, aircraft engines, propellers, appliances, or component parts which it operates in accordance with the applicable provisions of Part 121, 127, or 135 of this chapter, as appropriate.

(c) This section does not apply to persons performing inspections in accordance with Part 91, 123, 125, § 135.411(a)(1), or § 135.419 of this chapter.

(Approved by the Office of Management and Budget under OMB control number 2120–0020)

§ 43.11 [Content, form, and disposition of records for inspections conducted under Parts 91, and 125 and §§ 135.411(a)(1) and 135.419 of this chapter.]

(a) *Maintenance record entries.* The person approving or disapproving for return to service an aircraft, airframe, aircraft engine, propeller, appliance, or component part after any inspection performed in accordance with Part 91, 123, 125, § 135.411(a)(1), or § 135.419 shall make an entry in the maintenance record of that equipment containing the following information:

(1) The type of inspection and a brief description of the extent of the inspection.

(2) The date of the inspection and aircraft total time in service.

(3) The signature, the certificate number, and kind of certificate held by the person approving or disapproving for return to service

the aircraft, airframe, aircraft engine, propeller, appliance, component part, or portions thereof.

(4) Except for progressive inspections, if the aircraft is found to be airworthy and approved for return to service, the following or a similarly worded statement—"I certify that this aircraft has been inspected in accordance with (insert type) inspection and was determined to be in airworthy condition."

(5) Except for progressive inspections, if the aircraft is not approved for return to service because of needed maintenance, noncompliance with applicable specifications, airworthiness directives, or other approved data, the following or a similarly worded statement—"I certify that this aircraft has been inspected in accordance with (insert type) inspection and a list of discrepancies and unairworthy items dated (date) has been provided for the aircraft owner or operator."

(6) For progressive inspections, the following or a similarly worded statement—"I certify that in accordance with a progressive inspection program, a routine inspection of (identify whether aircraft or components) and a detailed inspection of (identify components) were performed and the (aircraft or components) are (approved or disapproved) for return to service." If disapproved, the entry will further state "and a list of discrepancies and unairworthy items dated (date) has been provided to the aircraft owner or operator."

(7) If an inspection is conducted under an inspection program provided for in Part 91, 123, 125, or § 135.411(a)(1), the entry must identify the inspection program, that part of the inspection program accomplished, and contain a statement that the inspection was performed in accordance with the inspections and procedures for that particular program.

(b) [*Listing of discrepancies and placards.* If the person performing any inspection required by Part 91 or 125 or § 135.411(a)(1) of this chapter finds that the aircraft is unairworthy or does not meet the applicable type certificate data, airworthiness directives, or other approved data upon which its airworthiness depends, that person must give the owner or lessee a signed and dated list of those discrepancies. For those items permitted to be inoperative under § 91.30(d)(2), that person shall place a placard, that meets the aircraft's airworthiness certification regulations, on each inoperative instrument and the cockpit control of each item of inoperative equipment, marking it "Inoperative," and shall add the items to the signed and dated list of discrepancies given to the owner or lessee.]

§ 43.12 Maintenance records: falsification, reproduction, or alteration.

(a) No person may make or cause to be made:

(1) Any fraudulent or intentionally false entry in any record or report that is required to be made, kept, or used to show compliance with any requirement under this part;

(2) Any reproduction, for fraudulent purpose, of any record or report under this part; or

(3) Any alteration, for fraudulent purpose, of any record or report under this part.

(b) The commission by any person of an act prohibited under paragraph (a) of this section is a basis for suspending or revoking the applicable airman, operator, or production certificate, Technical Standard Order Authorization, FAA-Parts Manufacturer Approval, or Product and Process Specification issued by the Administrator and held by that person.

§ 43.13 Performance rules (general).

(a) Each person performing maintenance, alteration, or preventive maintenance on an aircraft, engine, propeller, or appliance shall use the methods, techniques, and practices prescribed in the current manufacturer's maintenance manual or Instructions for Continued Airworthiness prepared by its manufacturer, or other methods, techniques, and practices acceptable to the Administrator, except as noted in § 43.16. He shall use the tools, equipment, and test apparatus necessary to assure completion of the work in accordance with accepted industry practices. If special equipment or test apparatus is recommended by the manufacturer involved, he must use that equipment or apparatus or its equivalent acceptable to the Administrator.

(b) Each person maintaining or altering, or performing preventive maintenance, shall do that work in such a manner and use materials of such a quality, that the condition of the aircraft, airframe, aircraft engine, propeller, or appliance worked on will be at least equal to its

original or properly altered condition (with regard to aerodynamic function, structural strength, resistance to vibration and deterioration, and other qualities affecting airworthiness).

(c) *Special provisions for holders of air carrier operating certificates and operating certificates issued under the provisions of Part 121, 127, or 135 and Part 129 operators holding operations specifications.* Unless otherwise notified by the Administrator, the methods, techniques, and practices contained in the maintenance manual or the maintenance part of the manual of the holder of an air carrier operating certificate or an operating certificate under Part 121, 127, or 135 (that is required by its operating specifications to provide a continuous airworthiness maintenance and inspection program) and Part 129 operators holding operations specifications constitute acceptable means of compliance with this section.

(d) [Deleted.]

§ 43.15 Additional performance rules for inspections.

(a) *General.* Each person performing an inspection required by Part 91, 123, 125, or 135 of this chapter, shall—

(1) Perform the inspection so as to determine whether the aircraft, or portion(s) thereof under inspection, meets all applicable airworthiness requirements; and

(2) If the inspection is one provided for in Part 123, 125, 135, or [§ 91.409(e)] of this chapter, perform the inspection in accordance with the instructions and procedures set forth in the inspection program for the aircraft being inspected.

(b) *Rotorcraft.* Each person performing an inspection required by Part 91 on a rotorcraft shall inspect the following systems in accordance with the maintenance manual or Instructions for Continued Airworthiness of the manufacturer concerned:

(1) The drive shafts or similar systems.

(2) The main rotor transmission gear box for obvious defects.

(3) The main rotor and center section (or the equivalent area).

(4) The auxiliary rotor on helicopters.

(c) *Annual and 100-hour inspections.*

(1) Each person performing an annual or 100-hour inspection shall use a checklist while performing the inspection. The checklist may be of the person's own design, one provided by the manufacturer of the equipment being inspected, or one obtained from another source. This checklist must include the scope and detail of the items contained in Appendix D to this part and paragraph (b) of this section.

(2) Each person approving a reciprocating-engine-powered aircraft for return to service after an annual or 100-hour inspection shall, before that approval, run the aircraft engine or engines to determine satisfactory performance, in accordance with the manufacturer's recommendations, of—

(i) Power output (static and idle r.p.m.);

(ii) Magnetos;

(iii) Fuel and oil pressure; and

(iv) Cylinder and oil temperature.

(3) Each person approving a turbine-engine-powered aircraft for return to service after an annual, 100-hour, progressive inspection shall, before that approval, run the aircraft engine or engines to determine satisfactory performance in accordance with the manufacturer's recommendations.

(d) *Progressive inspection.*

(1) Each person performing a progressive inspection shall, at the start of a progressive inspection system, inspect the aircraft completely. After this initial inspection, routine and detailed inspections must be conducted as prescribed in the progressive inspection schedule. Routine inspections consist of visual examination or check of the appliances, the aircraft, and its components and systems, insofar as practicable without disassembly. Detailed inspections consist of a thorough examination of the appliances, the aircraft, and its components and systems, with such disassembly as is necessary. For the purposes of

this subparagraph, the overhaul of a component or system is considered to be a detailed inspection.

(2) If the aircraft is away from the station where inspections are normally conducted, an appropriately rated mechanic, a certificated repair station, or the manufacturer of the aircraft may perform inspections in accordance with the procedures and using the forms of the person who would otherwise perform the inspection.

§ 43.16 Airworthiness Limitations.

Each person performing an inspection or other maintenance specified in an Airworthiness Limitations section of a manufacturer's maintenance manual or Instructions for Continued Airworthiness shall perform the inspection or other maintenance in accordance with that section, or in accordance with operations specifications approved by the Administrator under Parts 121, 123, 127, or 135, or an inspection program approved under [§ 91.409(e)].

§ 43.17 Mechanical work performed on U.S. registered aircraft by certain Canadian persons.

(a) A person holding a valid mechanic certificate of competence (Aircraft Maintenance Engineer license) and appropriate ratings issued by the Canadian Government, or a person who is an authorized employee (Approved Inspector) performing work for a company whose system of quality control for the inspection and maintenance of aircraft has been approved by the Canadian Department of Transport may, in connection with aircraft of U.S. registry in Canada:

(1) Perform maintenance, preventive maintenance and alterations if those operations are done in accordance with § 43.13 and the maintenance record entries are made in accordance with § 43.9.

(2) Except for an annual inspection, perform any inspection required by [§ 91.409] of this chapter, if the inspection is done in accordance with § 43.15 and the maintenance record entries are made in accordance with § 43.11.

(3) Approve (certify) maintenance, preventive maintenance, and alterations performed under this section except that a Canadian Aircraft Maintenance Engineer may not approve a major repair or major alteration.

(b) A Canadian Department of Transport Airworthiness Inspector, or an authorized employee (Approved Inspector) performing work for a company approved by the Canadian Department of Transport, may approve (certify) a major repair or major alteration performed under this section if the work was done in accordance with technical data approved by the Administrator.

(c) No person may operate in air commerce an aircraft, airframe, aircraft engine, propeller, or appliance on which maintenance, preventive maintenance, or alteration has been performed under this section unless it has been approved by a person authorized in this section.

NOTE.–The recordkeeping and reporting requirements contained herein have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

Appendix A

Major Alterations, Major Repairs, and Preventive Maintenance

(a) *Major alterations.*

(1) *Airframe major alterations.* Alterations of the following parts and alterations of the following types, when not listed in the aircraft specifications issued by the FAA, are airframe major alterations:

(i) Wings.

(ii) Tail surfaces.

(iii) Fuselage.

(iv) Engine mounts.

(v) Control system.

(vi) Landing gear.

(vii) Hull or floats.

(viii) Elements of an airframe including spars, ribs, fittings, shock absorbers, bracing, cowlings, fairings, and balance weights.

(ix) Hydraulic and electrical actuating system of components.

(x) Rotor blades.

(xi) Changes to the empty weight or empty balance which result in an increase in the maximum certificated weight or center of gravity limits of the aircraft.

(xii) Changes to the basic design of the fuel, oil, cooling, heating, cabin presssurization, electrical, hydraulic, de-icing, or exhaust systems.

(xiii) Changes to the wing or to fixed or movable control surfaces which affect flutter and vibration characteristics.

(2) *Powerplant major alterations.* The following alterations of a powerplant when not listed in the engine specifications issued by the FAA, are powerplant major alterations:

(i) Conversion of an aircraft engine from one approved model to another, involving any changes in compression ratio, propeller reduction gear, impeller gear ratios or the substitution of major engine parts which requires extensive rework and testing of the engine.

(ii) Changes to the engine by replacing aircraft engine structural parts with parts not supplied by the original manufacturer or parts not specifically approved by the Administrator.

(iii) Installation of an accessory which is not approved for the engine.

(iv) Removal of accessories that are listed as required equipment on the aircraft or engine specification.

(v) Installation of structural parts other than the type of parts approved for the installation.

(vi) Conversions of any sort for the purpose of using fuel of a rating or grade other than that listed in the engine specifications.

(3) *Propeller major alterations.* The following alterations of a propeller when not authorized in the propeller specifications issued by the FAA are propeller major alterations:

(i) Changes in blade design.

(ii) Changes in hub design.

(iii) Changes in the governor or control design.

(iv) Installation of a propeller governor or feathering system.

(v) Installation of propeller de-icing system.

(vi) Installation of parts not approved for the propeller.

(4) *Appliance major alterations.* Alterations of the basic design not made in accordance with recommendations of the appliance manufacturer or in accordance with an FAA Airworthiness Directive are appliance major alterations. In addition, changes in the basic design of radio communication and

navigation equipment approved under type certification or a Technical Standard Order that have an effect on frequency stability, noise level, sensitivity, selectivity, distortion, spurious radiation, AVC characteristics, or ability to meet environmental test conditions and other changes that have an effect on the performance of the equipment are also major alterations.

(b) *Major repairs.*

(1) *Airframe major repairs.* Repairs to the following parts of an airframe and repairs of the following types, involving the strengthening, reinforcing, splicing, and manufacturing of primary structural members or their replacement, when replacement is by fabrication such as riveting or welding, are airframe major repairs:

(i) Box beams.

(ii) Monocoque or semimonocoque wings or control surfaces.

(iii) Wing stringers or chord members.

(iv) Spars.

(v) Spar flanges.

(vi) Members of truss-type beams.

(vii) Thin sheet webs of beams.

(viii) Keel and chine members of boat hulls or floats.

(ix) Corrugated sheet compression members which act as flange material of wings or tail surfaces.

(x) Wing main ribs and compression members.

(xi) Wing or tail surface brace struts.

(xii) Engine mounts.

(xiii) Fuselage longerons.

(xiv) Members of the side truss, horizontal truss, or bulkheads.

(xv) Main seat support braces and brackets.

(xvi) Landing gear brace struts.

(xvii) Axles.

(xviii) Wheels.

(xix) Skis, and ski pedestals.

(xx) Parts of the control system such as control columns, pedals, shafts, brackets, or horns.

(xxi) Repairs involving the substitution of material.

(xxii) The repair of damaged areas in metal or plywood stressed covering exceeding six inches in any direction.

(xxiii) The repair of portions of skin sheets by making additional seams.

(xxiv) The splicing of skin sheets.

(xxv) The repair of three or more adjacent wing or control surface ribs or the leading edge of wings and control surfaces, between such adjacent ribs.

(xxvi) Repair of fabric covering involving an area greater than that required to repair two adjacent ribs.

(xxvii) Replacement of fabric on fabric covered parts such as wings, fuselages, stabilizers, and control surfaces.

(xxviii) Repairing, including rebottoming, of removable or integral fuel tanks and oil tanks.

(2) *Powerplant major repairs.* Repairs of the following parts of an engine and repairs of the following types, are powerplant major repairs:

(i) Separation or disassembly of a crankcase or crankshaft of a reciprocating engine equipped with an integral supercharger.

(ii) Separation or disassembly of a crankcase or crankshaft of a reciprocating engine equipped with other than spurtype propeller reduction gearing.

(iii) Special repairs to structural engine parts by welding, plating, metalizing, or other methods.

(3) *Propeller major repairs.* Repairs of the following types to a propeller are propeller major repairs:

(i) Any repairs to, or straightening of steel blades.

(ii) Repairing or machining of steel hubs.

(iii) Shortening of blades.

(iv) Retipping of wood propellers.

(v) Replacement of outer laminations on fixed-pitch wood propellers.

(vi) Repairing elongated bolt holes in the hub of fixed-pitch wood propellers.

(vii) Inlay work on wood blades.

(viii) Repairs to composition blades.

(ix) Replacement of tip fabric.

(x) Replacement of plastic covering.

(xi) Repair of propeller governors.

(xii) Overhaul of controllable pitch propellers.

(xiii) Repairs to deep dents, cuts, scars, nicks, etc., and straightening of aluminum blades.

(xiv) The repair or replacement of internal elements of blades.

(4) *Appliance major repairs.* Repairs of the following types to appliances are appliance major repairs:

(i) Calibration and repair of instruments.

(ii) Calibration of radio equipment.

(iii) Rewinding the field coil of an electrical accessory.

(iv) Complete disassembly of complex hydraulic power valves.

(v) Overhaul of pressure type carburetors, and pressure type fuel, oil, and hydraulic pumps.

(c) *Preventive maintenance.* Preventive maintenance is limited to the following work, provided it does not involve complex assembly operations:

(1) Removal, installation, and repair of landing gear tires.

(2) Replacing elastic shock absorber cords on landing gear.

(3) Servicing landing gear shock struts by adding oil, air, or both.

(4) Servicing landing gear wheel bearings, such as cleaning and greasing.

(5) Replacing defective safety wiring or cotter keys.

(6) Lubrication not requiring disassembly other than removal of nonstructural items such as cover plates, cowlings, and fairings.

(7) Making simple fabric patches not requiring rib stitching or the removal of structural parts or control surfaces. In the case of balloons, the making of small fabric repairs to envelopes (as defined in, and in accordance with, the balloon manufacturers' instructions) not requiring load tape repair or replacement.

(8) Replenishing hydraulic fluid in the hydraulic reservoir.

(9) Refinishing decorative coating of fuselage, balloon baskets, wings, tail group surfaces (excluding balanced control surfaces), fairings, cowlings, landing gear, cabin, or cockpit interior when removal or disassembly of any primary structure or operating system is not required.

(10) Applying preservative or protective material to components where no disassembly of any primary structure or operating system is involved and where such coating is not prohibited or is not contrary to good practices.

(11) Repairing upholstery and decorative furnishings of the cabin, cockpit, or balloon interior when the repairing does not require disassembly of any primary structure or operating system or interfere with an operating system or affect primary structure of the aircraft.

(12) Making small simple repairs to fairings, nonstructural cover plates, cowlings, and small patches and reinforcements not changing the contour so as to interfere with proper airflow.

(13) Replacing side windows where that work does not interfere with the structure or any operating system such as controls, electrical equipment, etc.

(14) Replacing safety belts.

(15) Replacing seats or seat parts with replacement parts approved for the aircraft, not involving disassembly of any primary structure or operating system.

(16) Trouble shooting and repairing broken circuits in landing light wiring circuits.

(17) Replacing bulbs, reflectors, and lenses of position and landing lights.

(18) Replacing wheels and skis where no weight and balance computation is involved.

(19) Replacing any cowling not requiring removal of the propeller or disconnection of flight controls.

(20) Replacing or cleaning spark plugs and setting of spark plug gap clearance.

(21) Replacing any hose connection except hydraulic connections.

(22) Replacing prefabricated fuel lines.

(23) Cleaning or replacing fuel and oil strainers or filter elements.

(24) Replacing and servicing batteries.

[(25)] Cleaning of balloon burner pilot and main nozzles in accordance with the balloon manufacturer's instructions.

[(26)] Replacement or adjustment of nonstructural standard fasteners incidental to operations.

[(27)] The interchange of balloon baskets and burners on envelopes when the basket or burner is designated as interchangeable in the balloon type certificate data and the baskets and burners are specifically designed for quick removal and installation.]

[(28)] The installation of anti-misfueling devices to reduce the diameter of fuel tank filler openings provided the specific device has been made a part of the aircraft type certificate data by the aircraft manufacturer, the aircraft manufacturer has provided FAA-approved instructions for installation of the specific device, and installation does not involve the disassembly of the existing tank filler opening.

[(29)] Removing, checking, and replacing magnetic chip detectors.

Appendix B

Recording of Major Repairs and Major Alterations

(a) Except as provided in paragraphs (b), (c), and (d) of this appendix, each person performing a major repair or major alteration shall—

(1) Execute FAA Form 337 at least in duplicate;

(2) Give a signed copy of that form to the aircraft owner; and

(3) Forward a copy of that form to local FAA District Office within 48 hours after the aircraft, airframe, aircraft engine, propeller, or appliance is approved for return to service.

(b) For major repairs made in accordance with a manual or specification acceptable to the Administrator, a certificated repair station may, in place of the requirements of paragraph (a)—

(1) Use the customer's work order upon which the repair is recorded;

(2) Give the aircraft owner a signed copy of the work order and retain a duplicate copy for at least 2 years from the date of approval for return to service of the aircraft, airframe, aircraft engine, propeller, or appliance;

(3) Give the aircraft owner a maintenance release signed by an authorized representative of the repair station and incorporating the following information:

(i) Identity of the aircraft, airframe, aircraft engine, propeller, or appliance.

(ii) If an aircraft, the make, model, serial number, nationality and registration marks, and location of the repaired area.

(iii) If an airframe, aircraft engine, propeller, or appliance, give the manufacturer's name, name of the part, model, and serial numbers (if any); and

(4) Include the following or a similarly worded statement—

"The aircraft, airframe, aircraft engine, propeller, or appliance identified above was repaired and inspected in accordance with current Regulations of the Federal Aviation Administration and is approved for return to service.

"Pertinent details of the repair are on file at this repair station under Order No. _____. Date_____

Signed _____ for
(signature of authorized representative)

_____ _____
(repair station name) (certificate no.)

_____ ."
(address)

(c) For a major repair or major alteration made by a person authorized in § 43.17, the person who performs the major repair or major alteration and the person authorized by § 43.17 to approve that work shall execute a FAA Form 337 at least in duplicate. A completed copy of that form shall be—

(1) Given to the aircraft owner; and

(2) Forwarded to the Federal Aviation Administration, Aircraft Registration Branch, P.O. Box 25082, Oklahoma City, Oklahoma 73125, within 48 hours after the work is inspected.

(d) For extended-range fuel tanks installed within the passenger compartment or a baggage compartment, the person who performs the work and the person authorized to approve the work by § 43.7 of this part shall execute an FAA Form 337 in at least triplicate. One (1) copy of the FAA Form 337 shall be placed on board the aircraft as specified in [§ 91.417] of this chapter. The remaining forms shall be distributed as required by paragraph (a)(2) and (3) or (c)(1) and (2) of this paragraph as appropriate.

Appendix C

[Revoked]

Appendix D

Scope and Detail of Items (as Applicable to the Particular Aircraft) to be Included in Annual and 100-Hour Inspections

(a) Each person performing an annual or 100-hour inspection shall, before that inspection, remove or open all necessary inspection plates, access doors, fairing, and cowling. He shall thoroughly clean the aircraft and aircraft engine.

(b) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the fuselage and hull group:

(1) Fabric and skin—for deterioration, distortion, other evidence of failure, and defective or insecure attachment of fittings.

(2) Systems and components—for improper installation, apparent defects, and unsatisfactory operation.

(3) Envelope, gas bags, ballast tanks, and related parts—for poor condition.

(c) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the cabin and cockpit group:

(1) Generally—for uncleanliness and loose equipment that might foul the controls.

(2) Seats and safety belts—for poor condition and apparent defects.

(3) Windows and windshields—for deterioration and breakage.

(4) Instruments—for poor condition, mounting, marking, and (where practicable) for improper operation.

(5) Flight and engine controls—for improper installation and improper operation.

(6) Batteries—for improper installation and improper charge.

(7) All systems—for improper installation, poor general condition, apparent and obvious defects, and insecurity of attachment.

(d) Each person performing an annual or 100-hour inspection shall inspect (where applicable) components of the engine and nacelle group as follows:

(1) Engine section—for visual evidence of excessive oil, fuel, or hydraulic leaks, and sources of such leaks.

(2) Studs and nuts—for improper torquing and obvious defects.

(3) Internal engine—for cylinder compression and for metal particles or foreign matter on screens and sump drain plugs. If there is weak cylinder compression, for improper internal condition and improper internal tolerances.

(4) Engine mount—for cracks, looseness of mounting, and looseness of engine to mount.

(5) Flexible vibration dampeners—for poor condition and deterioration.

(6) Engine controls—for defects, improper travel, and improper safetying.

(7) Lines, hoses, and clamps—for leaks, improper condition, and looseness.

(8) Exhaust stacks—for cracks, defects, and improper attachment.

(9) Accessories—for apparent defects in security of mounting.

(10) All systems—for improper installation, poor general condition, defects, and insecure attachment.

(11) Cowling—for cracks, and defects.

(e) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the landing gear group:

(1) All units—for poor condition and insecurity of attachment.

(2) Shock absorbing devices—for improper oleo fluid level.

(3) Linkage, trusses, and members—for undue or excessive wear, fatigue, and distortion.

(4) Retracting and locking mechanism—for improper operation.

(5) Hydraulic lines—for leakage.

(6) Electrical system—for chafing and improper operation of switches.

(7) Wheels—for cracks, defects, and condition of bearings.

(8) Tires—for wear and cuts.

(9) Brakes—for improper adjustment.

(10) Floats and skis—for insecure attachment and obvious or apparent defects.

(f) Each person performing an annual or 100-hour inspection shall inspect (where applicable) all components of the wing and center section assembly for poor general condition, fabric or skin deterioration, distortion, evidence of failure, and insecurity of attachment.

(g) Each person performing an annual or 100-hour inspection shall inspect (where applicable) all components and systems that make up the complete empennage assembly for poor general condition, fabric or skin deterioration, distortion, evidence of failure, insecure attachment, improper component installation, and improper component operation.

(h) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the propeller group:

(1) Propeller assembly—for cracks, nicks, binds, and oil leakage.

(2) Bolts—for improper torquing and lack of safetying.

(3) Anti-icing devices—for improper operations and obvious defects.

(4) Control mechanisms—for improper operation, insecure mounting, and restricted travel.

(i) Each person performing an annual or 100-hour inspection shall inspect (where applicable) the following components of the radio group:

(1) Radio and electronic equipment—for improper installation and insecure mounting.

(2) Wiring and conduits—for improper routing, insecure mounting, and obvious defects.

(3) Bonding and shielding—for improper installation and poor condition.

(4) Antenna including trailing antenna—for poor condition, insecure mounting, and improper operation.

(j) Each person performing an annual or 100-hour inspection shall inspect (where applicable) each installed miscellaneous item that is not otherwise covered by this listing for improper installation and improper operation.

Appendix E

Altimeter System Test and Inspection

Each person performing the altimeter system tests and inspections required by [§ 91.411] shall comply with the following:

(a) Static pressure system:

(1) Ensure freedom from entrapped moisture and restrictions.

(2) Determine that leakage is within the tolerances established in § 23.1325 or § 25.1325, whichever is applicable.

(3) Determine that the static port heater, if installed, is operative.

(4) Ensure that no alterations or deformation of the airframe surface have been made that would affect the relationship between air pressure in the static pressure system and true ambient static air pressure for any flight condition.

(b) Altimeter:

(1) Test by an appropriately rated repair facility in accordance with the following subparagraphs. Unless otherwise specified, each test for performance may be conducted with the instrument subjected to vibration. When tests are conducted with the temperature substantially different from ambient temperature of approximately 25 degrees C., allowance shall be made for the variation from the specified condition.

(i) *Scale error*—With the barometric pressure scale at 29.92 inches of mercury, the altimeter shall be subjected successively to pressures corresponding to the altitude specified in Table I up to the maximum normally expected operating altitude of the airplane in which the altimeter is to be installed. The reduction in pressure shall be made at a rate not in excess of 20,000 feet per minute to within approximately 2,000 feet of the test point. The test point shall be approached at a rate compatible with the test equipment. The altimeter shall be kept at the pressure corresponding to each test point for at least one minute, but not more than ten minutes, before a reading is taken. The error at all test points must not exceed the tolerances specified in Table I.

(ii) *Hysteresis*—The hysteresis test shall begin not more than 15 minutes after the altimeter's initial exposure to the pressure corresponding to the upper limit of the scale error test prescribed in subparagraph (i); and while the altimeter is at this pressure, the hysteresis test shall commence. Pressure shall be increased at a rate simulating a descent in altitude at the rate of 5,000 to 20,000 feet per minute until within 3,000 feet of the first test point (50 percent of maximum altitude). The test point shall then be approached at a rate of approximately 3,000 feet per minute. The altimeter shall be kept at this pressure for at least 5 minutes, but not more than 15 minutes, before the test reading is taken. After the reading has been taken, the pressure shall be increased further, in the same manner as before, until the pressure corresponding to the second test point (40 percent of maximum altitude) is reached. The altimeter shall be kept at this pressure for at least one minute, but not more than 10 minutes, before the test reading is taken. After the reading has been taken, the pressure shall be increased further, in the same manner as before, until atmospheric pressure is reached. The reading of the altimeter at either of the two test points shall not differ by more than the tolerance specified in Table II from the reading of the altimeter for the corresponding altitude recorded during the scale error test prescribed in subparagraph (i).

(iii) *After effect*—Not more than 5 minutes after the completion of the hysteresis test prescribed in subparagraph (ii), the reading of the altimeter (corrected for any

change in atmospheric pressure) shall not differ from the original atmospheric pressure reading by more than the tolerance specified in Table II.

(iv) *Friction*—The altimeter shall be subjected to a steady rate of decrease of pressure approximating 750 feet per minute. At each altitude listed in Table III, the change in reading of the pointers after vibration shall not exceed the corresponding tolerance listed in Table III.

(v) *Case leak*—The leakage of the altimeter case, when the pressure within it corresponds to an altitude of 18,000 feet, shall not change the altimeter reading by more than the tolerance shown in Table II during an interval of one minute.

(vi) *Barometric scale error*—At constant atmospheric pressure, the barometric pressure scale shall be set at each of the pressures (falling within its range of adjustment) that are listed in Table IV, and shall cause the pointer to indicate the equivalent altitude difference shown in Table IV with a tolerance of 25 feet.

(2) Altimeters which are the air data computer type with associated computing systems, or which incorporate air data correction internally, may be tested in a manner and to specifications developed by the manufacturer which are acceptable to the Administrator.

[(c) Automatic Pressure Altitude Reporting Equipment and ATC Transponder System Integration Test. The test must be conducted by an appropriately rated person under the conditions specified in paragraph (a). Measure the automatic pressure altitude at the output of the installed ATC transponder when interrogated on Mode C at a sufficient number of test points to ensure that the altitude reporting equipment, altimeters, and ATC transponders perform their intended functions as installed in the aircraft. The difference between the automatic reporting output and the altitude displayed at the altimeter shall not exceed 125 feet.]

[(d)] Records: Comply with the provisions of § 43.9 of this chapter as to content, form and disposition of the records. The person performing the altimeter tests shall record on the altimeter the date and maximum altitude to which the altimeter has been tested and the persons approving the airplane for return to service shall enter that data in the airplane log or other permanent record.

TABLE I

Altitude (Feet)	Equivalent pressure (inches of mercury)	Tolerance ± (Feet)
−1,000	31.018	20
0	29.921	20
500	29.385	20
1,000	28.856	20
1,500	28.335	25
2,000	27.821	30
3,000	26.817	30
4,000	25.842	35
6,000	23.978	40
8,000	22.225	60
10,000	20.577	80
12,000	19.029	90
14,000	17.577	100
16,000	16.216	110
18,000	14.942	120
20,000	13.750	130
22,000	12.636	140
25,000	11.104	155
30,000	8.885	180
35,000	7.041	205
40,000	5.538	230
45,000	4.355	255
50,000	3.425	280

TABLE II—TEST TOLERANCES

Test	Tolerance (Feet)
Case Leak Test	± 100
Hysteresis Test:	
First Test Point (50 percent of maximum altitude)	75
Second Test Point (40 percent of maximum altitude)	75
After Effect Test	30

TABLE III—FRICTION

Altitude (Feet)	Tolerance (Feet)
1,000	± 70
2,000	70
3,000	70
5,000	70
10,000	80
15,000	90
20,000	100
25,000	120
30,000	140
35,000	160
40,000	180
50,000	250

TABLE IV—PRESSURE-ALTITUDE DIFFERENCE

Pressure (Inches of Hg)	Altitude Difference (Feet)
28.10	−1727
28.50	−1340
29.00	−863
29.50	−392
29.92	0
30.50	+531
30.90	+893
30.99	+974

Appendix F

ATC Transponder Tests and Inspections

The ATC transponder tests required by Section [91.413] of this chapter may be conducted using a bench check or portable test equipment and must meet the requirements prescribed in paragraphs (a) through (j) of this appendix. If portable test equipment with appropriate coupling to the aircraft antenna system is used, operate the test equipment for ATCRBS transponders at a nominal rate of 235 interrogations per second to avoid possible ATCRBS interference. Operate the test equipment at a nominal rate of 50 Mode S interrogations per second for Mode S. An additional 3dB loss is allowed to compensate for antenna coupling errors during receiver sensitivity measurements conducted in accordance with paragraph (c) (1) when using portable test equipment.

(a) Radio Reply Frequency:

(1) For all classes of ATCRBS transponders, interrogate the transponder and verify that the reply frequency is 1090 ± 3 Megahertz (MHz).

(2) For classes 1B, 2B, and 3B Mode S transponders, interrogate the transponder and verify that the reply frequency is 1090 ± 3 MHz.

(3) For classes 1B, 2B, and 3B Mode S transponders that incorporate the optional 1090 ± 1 MHz reply frequency, interrogate the transponder and verify that the reply frequency is correct.

(4) For classes 1A, 2A, 3A, and 4 Mode S transponders, interrogate the transponder and verify that the reply frequency is 1090 ± 1 MHz.

(b) Suppression: When Classes 1B and 2B ATCRBS Transponders, or Classes 1B, 2B, and 3B Mode S transponders are interrogated Mode 3/A at an interrogation rate between 230 and 1,000 interrogations per second; or when Classes 1A and 2A ATCRBS Transponders, or Classes 1B, 2A, 3A, and 4 Mode S transponders are interrogated at a rate between 230 and 1,200 Mode 3/A interrogations per second:

(1) Verify that the transponder does not respond to more than 1 percent of ATCRBS interrogations when the amplitude of P_2 pulse is equal to the P_1 pulse.

(2) Verify that the transponder replies to at least 90 percent of ATCRBS interrogations when the amplitude of the P_2 pulse is 9 dB less than the P_1 pulse. If the test is conducted with a radiated test signal, the interrogation rate shall be 235 ± 5 interrogations per second unless a higher rate has been approved for the test equipment used at that location.

(c) Receiver Sensitivity:

(1) Verify that for any class of ATCRBS Transponder, the receiver minimum triggering level (MTL) of the system is $-73 + 4$ dbm, or that for any class of Mode S transponder the receiver MTL for Mode S format (P_6 type) interrogations is $-74 + 3$ dbm by use of a test set either:

(i) connected to the antenna end of the transmission line;

(ii) connected to the antenna terminal of the transponder with a correction for transmission line loss; or

(iii) utilizing a radiated signal.

(2) Verify that the difference in Mode 3/A and Mode C receiver sensitivity does not exceed 1 db for either any class of ATCRBS transponder or any class of Mode S transponder.

[(d) Radio Frequency (RF) Peak Output Power:

[(1) Verify that the transponder RF output power is within specifications for the class of transponder. Use the same conditions as described in (c)(1)(i), (ii), and (iii) above.

[(i) For Class 1A and 2A ATCRBS transponders, verify that the minimum RF peak output power is at least 21.0 dbw (125 watts).

[(ii) For Class 1B and 2B ATCRBS Transponders, verify that the minimum RF peak output power is at least 18.5 dbw (70 watts).

[(iii) For Class 1A, 2A, 3A, and 4 and those Class 1B, 2B, and 3B Mode S transponders that include the optional high RF peak output power, verify that the minimum RF peak output power is at least 21.0 dbw (125 watts).

[(iv) For Classes 1B, 2B, and 3B Mode S transponders, verify that the minimum RF peak output power is at least 18.5 dbw (70 watts).

[(v) For any class of ATCRBS or any class of Mode S transponders, verify that the maximum RF peak output power does not exceed 27.0 dbw (500 watts).

Note: The test in (e) through (j) apply only to Mode S transponders.

[(e) Mode S Diversity Transmission Channel Isolation: For any class of Mode S transponder that incorporates diversity operation, verify that the RF peak output power transmitted from the selected antenna exceeds the power transmitted from the nonselected antenna by at least 20 db.

[(f) Mode S Address: Interrogate the Mode S transponder and verify that it replies only to its assigned address. Use the correct address and at least two incorrect addresses. The interrogations should be made at a nominal rate of 50 interrogations per second.

[(g) Mode S Formats: Interrogate the Mode S transponder with uplink formats (UF) for which it is equipped and verify that the replies are made in the correct format. Use the surveillance formats UF-4 and 5. Verify that the altitude reported in the replies to UF-4 are the same as that reported in a valid ATCRBS Mode C reply. Verify that the identity reported in the replies to UF-5 are the same as that reported in a valid ATCRBS Mode 3/A reply. If the transponder is so equipped, use the communications formats UF-20, 21, and 24.

[(h) Mode S All-Call Interrogations: Interrogate the Mode S transponder with the Mode S-only all-call format UF-11, and the ATCRBS/Mode S all-call formats (1.6 microsecond P_4 pulse) and verify that the correct address and capability are reported in the replies (downlink format DF-11).

[(i) ATCRBS-Only All-Call Interrogation: Interrogate the Mode S transponder with the ATCRBS-only all-call interrogation (0.8 microsecond P_4 pulse) and verify that no reply is generated.

[(j) Squitter: Verify that the Mode S transponder generates a correct squitter approximately once per second.

[(k) Records: Comply with the provisions of Section 43.9 of this chapter as to content, form, and disposition of the records.]

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